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# ABSTRACTS OF TUBERCULOSIS

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**Abstracts of Tuberculosis *will be published at intervals as an integral part of the* American Review of Tuberculosis. *It will receive separate paging and may, if desired, be bound separately at the completion of the volume.***

***The Abstract Editor is Dr. George Mannheimer, 41 West 51st Street, New York City. Prompt transmission to him of reprints or abstracts of papers on tuberculosis, sanatorium or board of health reports, etc., will promote their early publication in this section.***

***Abstracts should be sent typewritten on one side of the page only. They should be as concise and compact as the subject matter of the article warrants. They should be headed with a short title, and followed by the full title of the paper, author's name, journal, date, volume and page***

**Public Health Service takes over Army Hospitals.**—Two army hospitals, one in North Carolina and the other in New York harbor, will be taken over by the United States Public Health Service during the first week in November, 1920. The North Carolina hospital (O'Reilly Hospital), which is at Oteen, eight miles from Asheville, will be continued as a tuberculosis hospital with about 1000 beds. Dr. W. M. Foster will be in temporary charge. The location of the hospital is beautiful and the institution is admirably adapted to the treatment of tuberculous disease. The buildings were erected by the army for that particular purpose and are superior to most of those in base camps. Two of the wards will be remodeled; and some additional buildings will be erected for the use of the staff, especially the married staff, for whom no accommodations now exist. The present patients will probably remain, if the hospital equipment can be taken over with them. The nurses, except those who wish to take accrued leave, will remain.—*From a bulletin of U. S. Public Health Service.*

**To Distinguish Exudates from Transudates.**—The authors commend, as very reliable, Sochanski's technic for this purpose. It never failed in the thirty-eight cases tabulated. The reagent is made with 1 cc. each of a 1 per cent solution of phenolphthalein and of tenth-normal solution of sodium hydroxid to which double distilled water is added to a total of 100 cc. To 9 cc. of this fluid is added a drop of the fluid to be tested. The reagent was always decolorized when the fluid was an exudate while the tint remained unchanged with the transudates. The reaction can be made more sensitive by using smaller amounts of the reagent. The findings are more reliable than with determination of the albumin with other tests of the kind, as is shown by the parallel findings with titration and other tests.—*Sockanski's Methode til Adskillelse af Exsudates og Transsudates, R. B. Larsen and K. Secker, Hospitalstid, May 5, 1920, lxiii, 273.*

**General Paresis in Tuberculosis.**—Roque and Cordier describe a case of apparently typical paretic dementia in a man of fifty with pronounced tuberculosis of long standing and syphilis acquired thirty-four months before death. Necropsy revealed tuberculous meningitis and old tuberculous lesions in the cortex. They do not venture to decide whether the case is one of general paresis masquerading as an ordinary lesion, or whether the tuberculous leptomeningitis produced the syndrome of syphilitic general paresis.—*Du syndrome de paralysie générale au cours de la méningite tuberculeuse de l'adulte, S. Roque and V. Cordier, Paris Méd., May 22, 1920, x, 417.*

*Pulmonary tuberculosis: Deaths and death rates,* New York State and large subdivisions, August, 1913 to 1920*

| MONTH | YEAR | NEW YORK STATE | | NEW YORK CITY | | REST OF STATE | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Total | | Urban | | Rural | | Institutional districts | |
| | | Number | Rate | Number | Rate | Number | Rate | Number | Rate | Number | Rate | Number | Rate |
| August average | 1913–17 | 1,052 | 122.6 | 646 | 139.1 | 406 | 103.0 | 196 | 102.5 | 210 | 103.5 | | |
| August | 1913 | 1,017 | 123.1 | 631 | 142.9 | 386 | 100.4 | 173 | 92.5 | 213 | 108.5 | | |
| August | 1914 | 1,040 | 123.4 | 620 | 137.3 | 420 | 108.2 | 199 | 104.2 | 221 | 112.3 | | |
| August | 1915 | 1,081 | 125.8 | 699 | 150.5 | 382 | 96.9 | 193 | 100.9 | 189 | 93.2 | | |
| August | 1916 | 1,022 | 117.1 | 608 | 128.0 | 414 | 104.1 | 213 | 110.0 | 201 | 98.4 | | |
| August | 1917 | 1,100 | 123.4 | 672 | 138.2 | 428 | 106.3 | 203 | 103.1 | 225 | 108.8 | | |
| August | 1918 | 1,003 | 110.8 | 563 | 113.1 | 440 | 107.9 | 183 | 91.2 | 215 | 103.5 | 42 | |
| August | 1919 | 919 | 99.5 | 546 | 107.2 | 373 | 90.5 | 147 | 71.9 | 182 | 87.1 | 44 | |
| August | 1920 | 796 | 84.9 | 447 | 85.9 | 349 | 83.7 | 124 | 60.0 | 176 | 83.7 | 49 | |

* Deaths per 100,000 population per annum.

Data from New York State Health Department Annual Reports and Monthly Bulletins, or specially computed.

**Deaths and Death Rates from Pulmonary Tuberculosis in New York City and State.**—The following table, showing the deaths and death rates from pulmonary tuberculosis for New York City and State, for August, during the years 1914 to 1920 inclusive, are taken from the *Monthly Vital Statistics Review, New York State Department of Health, October, 1920, New Series, vol. i, no. 8.*

**Itinerant Consultation Service.**—Consultation service for the detection of tuberculosis had its inception in the Framingham Health Demonstration. It was found that the time of one of their chiefs was being requested regularly by practising physicians. In Barnstable County the resident physician of the county tuberculosis sanatorium acts as consultant. During the first year propaganda carried directly to the people was not attempted. The scheme was to work through the physicians, visiting nurses and the local health board. In the handling of the cases it had to be decided whether to permit discussion in the presence of the patient. Two-thirds of the physicians on Cape Cod have used the consultation service. Five to six consultations are expected monthly. During the year, 148 patients were examined: 77 in the clinics, 71 in consultation; and 27 out of 44 positive cases were diagnosed at first hand by the consultant. The function of the consultant in prognosis and treatment is most important. Twelve out of 58 adults who were found nontuberculous were suffering from asthma. The ratio of dead to living tuberculous has been increased from 1 to 3.5 to 1 to 5. In Provincetown 12 of 13 found tuberculous were Portuguese. The cost of the experiment has approximated $5.50 per examination, or $29 for each case of tuberculosis examined. Until consultation service is lifted out of the experimental stage, any cost is justifiable.—*Itinerant Consultation Service, H. S. Wagner, Boston M. & S. J., September 16, 1920, clxxxiii, 351.*

**Rhode Island State Sanatorium Report.**—On January 1, 1919, there were 179 patients present. During the year there were 552 admissions and 481 discharges. On December 31, 1919, there were 246 patients. The whole number of patients treated during the year was 738. The average daily number of patients was 232. Of the 481 patients discharged 1 was apparently cured, 6 had their disease arrested, 66 were quiescent, 121 improved, 132 unimproved, and 127 died. Two were nontuberculous and 4 left before diagnosis was made. The average number of patients in the two wards was 88.6. The considerable number of empty beds in both the sanatorium and the hospital (total over 100) is not peculiar to this institution. Late in 1918 and early in 1919 influenza, by absorbing the time of physicians and tuberculosis nurses, reduced hospitalization. High wages encourage home care and reduce morbidity. Eighty per cent of employees on the payroll have had clinical tuberculosis. Follow-up records of ex-patients who have worked at the hospital as compared to those who have worked elsewhere showed that 25 per cent more survived among those employed at the hospital. Among the causes of death asthenia due to tuberculosis was most frequent. Of the contributory causes laryngitis was most frequent, then enteritis, hemoptysis and meningitis. The weekly per capita cost of sanatorium treatment for 1919 was $13.78. The daily cost of raw food per person was about 58 cents. All sanatorium employees except the night nurses and cooks were put on a forty-eight hour week, actual working time, on July 1 of this year.—*Fifteenth Annual Report of the State Sanatorium at Wallum Lake for the Year Ending December 31, 1919, H. L. Barnes, Superintendent.*

**A Survey of Sanatorium Benefit.**—In July, 1912, no tuberculosis hospital or dispensary existed in Newcastle, and the local Insurance Committee and the City Council decided to enter upon a comprehensive "combined scheme," for dealing with all cases of tuberculosis occurring in Newcastle residents, insured and noninsured alike. The agreement embodying the scheme came into force in November, 1913, and was binding for fifteen years. Under its terms the Corporation agreed: (1) To establish, equip, staff and maintain a tuberculosis dispensary, the medical officer in charge of which should act as medical adviser to the insurance committee in regard to sanatorium benefit. (2) To maintain 30 beds for adult cases of pulmonary tuberculosis at Barrasford Sanatorium, of which 20 were reserved for insured persons. (3) To maintain 30 beds at Stannington Sanatorium for cases of tuberculosis occurring in children below sixteen years of age. (4) To build, equip and maintain two pavilions containing 62 beds for cases of phthisis at the City Hospital, Walker Gate. Summary of report of the interdepartmental committee on tuberculosis (sanatoria for soldiers), August 1919: (1) Approximately 35,000 men have been discharged for tuberculosis. Of these, 18,000 have completed residential treatment and 4,000 are at present receiving it. (2) At present 10,000 to 11,000 beds are available for the treatment of adult tuberculous males

and although ex-service men have priority as regards admission, the number is insufficient. (3) Sanatorium treatment as at present administered is regarded as unsatisfactory: (a) because the period is too short; (b) because the patients return to their old environment and relapse occurs. (4) Tuberculous persons should be dealt with in three stages, continuous with one another: first, the sanatorium, where treatment is mostly emphasized; second, the colony, where treatment is continued but training and graduated labor are the main objects; and third, the permanent village settlement, where permanent employment will be afforded but always under medical supervision. All three should be correlated to one another and should be situated in the same geographical area, e.g., same pensions' region. (5) For advanced cases suggestions are made for the provision of small homes in the larger centres and more ample accommodation in sanatoria. (6) It is desirable to establish convalescent hospitals in suitable localities for certain cases in which Sanatorium treatment is not considered necessary.—*Insurance Committee for the City of Newcastle-upon-Tyne. A Survey of Sanatorium Benefit, July, 1912–December, 1919, W. H. Dickinson, Medical Adviser.*

**The Migratory Consumptive.**—The indigent migratory consumptive is becoming a more serious economic problem each year, affecting chiefly Colorado, California and the whole Southwest. The average consumptive fails to realize that the progress toward cure is slow, that the climate is vain without rest, good food and a contented mind. Unless his bank account is large he becomes a burden to the community. The majority of consumptives who come to Arizona have come without medical advice. To add to the trouble, comes the discharged tuberculous soldier.—*The Migratory Consumptive as a Financial Burden to the Southwest, A. H. Williams, Southwest Med., September, 1920, iv, 13.*

**The Value of a County Tuberculosis Survey with Clinics.**—In Barnstable County, Mass., practically all the physicians were visited in an effort to obtain data on tuberculous and suspicious cases. From this data it was concluded that a plan should be made which would combine the following: (a) preparation of records, (b) supervised field nursing, (c) free clinics with expert medical advice, (d) accurate reports of existing conditions. In Oneida County, N. Y., a tuberculosis survey with clinics was conducted during the summer and fall of 1919. The facilities for care previous to the survey were as follows: The New York State Sanatorium at Ray Brook for the care of early cases; and the County Hospital, Rome, N. Y., for advanced cases. Utica, the largest city, had a clinic open two mornings a week, and an open air school. At the close of the survey it was found that of 467 cases, 59 patients were in sanatoria, while 408 patients were living at home. Seventy per cent of these cases were not under medical supervision. The following recommendations were made: (a) Utica be provided with an evening clinic, a supervising nurse and three assistants. (b) Rome city in Oneida county be provided with regular tuberculosis clinics and a follow-up nurse. (c) The towns in the county be provided with regular tuberculosis clinics and local public health nurses. As a result, the city made appropriations for a well-trained nurse. The county tuberculosis committee financed a Saranac Lake physician who held clinics every two weeks during the afternoon and evening. They also financed a public health nurse. An automobile was provided. The approximate cost of this survey was $8000, but it would appear to be a modest sum when it is remembered that 117 unregistered cases of tuberculosis were located for follow-up work.—*The Value of a County Tuberculosis Survey with Clinics, Bernice W. Billings, Boston M. & S. J., September 16, 1920, clxxxiii, 343.*

**The Work of a Tuberculosis Department.**—It is necessary that the general public should realize the uneconomical methods existing at present, under which a society compels its workers to toil, though ill and infectious, until they can toil no longer. Early medical attendance and early recognition by the profession are necessary. It should be made possible for a patient to go at once into an institution, sanatorium or hospital, if his condition necessitates it. Provision on an adequate scale must be made for the maintenance of the home while the patient is away. The family of the patient and his workmates should be examined. Periodical examinations should be made of all workers at their places of employment. When a patient recovers and is able to return to work but has to seek a new occupation which is less remunerative, the national funds should make up this loss. Many are unfit to return to the community. For these colonies must be established. In them work of all kinds must be provided, with reasonable recreation and opportunities for continuance of family life under well-defined conditions. Nothing is so disastrous to patients as the fostering of a belief that they can be of no use, and that initiative is to be

suppressed. Only by this method of segregation can we hope, with our present knowledge, to make any appreciable breach in the enormous mortality of tuberculosis. In no other disease of an infectious nature do we doubt the efficacy of isolation, and by no other disease do we suffer such a continuous drain upon the working capacity of the nation. A scientific system of town planning, cheap travelling facilities, pure food, abatement of smoke nuisances, stricter and more scientific supervision of dangerous trades, many of which are only dangerous because of the cheapness of human life,—all will benefit mankind and raise the national resisting powers against invasion by any pathogenic organisms, the tubercle bacillus included. Immediately what is wanted is to remove the great mass of infection which has established itself in our midst. —*The Work of a Tuberculosis Department, D. P. Sutherland, J. State Med., June, 1920, xxviii, 185.*

**Tuberculosis Clinics in Ontario County.**—Under the joint auspices of the Ontario County Tuberculosis Committee and the Geneva Health Bureau a monthly tuberculosis clinic has been established in Geneva. Up to the middle of August a total of 117 patients had been examined.—*News Items, New York. M. J., October 30, 1920, cxii, 686.*

**Improvements at Glen Ridge Sanatorium.**—The Board of Supervisors of Schenectady, N. Y., has voted $50,000 for repairs and improvements to be made at Glen Ridge Tuberculosis Sanatorium. In addition to extensive repairs, a new pavilion is to be created, a cooling system installed, and the present administration building enlarged.—*News Items, New York M. J., October 30, 1920, cxii, 686.*

**The Industrial Settlement for the Consumptive.**—The reason for the establishment of village settlements for consumptives is twofold: (1) the prolongation of the life of the consumptive without increasing his infectivity; and, (2) the healthy rearing of the next generation and the production in its members of increased resistance to disease. These objects cannot be attained by the mere provision of workshops for consumptives near towns, even if the labor is subsidized. For, such a plan, ignoring the adverse conditions of the infected workers' home life, would conduce neither to the arrest of the disease nor the prevention of the spread of infection. The village settlement can provide decent conditions for the families of consumptives, and, on the other hand, a hospital for the most advanced cases. The complete success of such a provision for the advanced cases is assured. The hope of the consumptive in such a hospital is encouraged to the end, and the chances of getting better are always before his mind. Not necessarily side by side, but under specially defined conditions, all stages of tuberculosis can be accommodated on the same estate. This simplifies the machinery of running the various institutions necessary, and also the running of the industrial settlement. Village settlements, when formed, will differ in many ways. The industries cannot always be the same, and the types of inhabitants will differ in different areas. No hard and fast plan can be outlined. The essential principles must be grasped and followed.—*The Industrial Settlement for the Consumptive, P. C. Varrier-Jones, and G. S. Woodhead, Lancet, May 8, 1920, cxcviii, 1041.*

**A Trade Organization Sanatorium.**—"Natsopa" is the name given the sanatorium recently opened at Wellsborough, Leicestershire, England, by the National Society of Operative Printers and Assistants. It is an instance of a trade organization voluntarily shouldering its own responsibility for the health of its members. It is not merely a sanatorium, but a factory as well, where convalescents are encouraged to work at their own trade for such periods as the physician allows. The psychological effect of thus getting back to skilled employment under favorable conditions can hardly be overestimated. The need for aftercare following sanatorium treatment is everywhere being acknowledged. In the plan adopted by the printers' sanatorium the psychology of industrial convalescence is recognized from two points of view: first, with regard to the influence exerted by occupation instead of idleness; and, secondly, by that occupation being useful and of the kind to be followed when health is regained—*Tuberculosis, Editorial, Lancet, June 26, 1920, cxcviii, 1379.*

**Vital Capacity in Pulmonary Tuberculosis.**—The authors in 1919 published a paper showing that definite relations existed between vital capacity and body surface, body weight, trunk length and chest circumference which can be expressed in definite mathematical formulae. The methods and formulae described were used in a study of vital capacity in 200 patients with pulmonary tuberculosis. It was found that in these cases there is a definite decrease in vital capacity as compared with what should be normal for the individual. An improve-

ment in the clinical condition is accompanied by an increased vital capacity; an advance of the disease, by a decrease. This, therefore, gives a valuable quantitative measure of the benefit, if any, resulting from treatment. The determination of vital capacity is useful for the classification of cases of pulmonary tuberculosis, because it is possible in this way to express numerically the injury to health (degree of toxemia), which otherwise would depend on the interpretation of physical signs by different observers. As an aid to diagnosis, a single or repeated examination of the vital capacity of doubtful cases will also prove useful. With a normal vital capacity, it is most uplikely that the patient is suffering from pulmonary tuberculosis. If the vital capacity is much decreased, the patient should be regarded as a suspect, always remembering that other diseases may also lower the vital capacity. Finally a systematic study of the vital capacity in its proper relationship to body size has given important information as to the beneficial effects of different treatments and has made it possible to distinguish quantitatively the degrees of improvement.—*The Vital Capacity Contents Applied to the Study of Pulmonary Tuberculosis, G. Dreyer and L. S. T. Burrell, Lancet, June 5, 1920, cxcviii,* 1212.

**A New Method for the Interpretation of Subfebrile Temperatures in Pulmonary Tuberculosis.**—Some patients, particularly those of the "nervous" type, run persistent subfebrile temperatures not warranted by the slight exent of their disease. In order to bring light into this vexing phenomenon the following experimentation was carried out on subfebrile patients. They were kept in bed from four to five days, and during this time their mouth and rectal temperatures were taken (synchronously) every two hours from 7 a.m. to 7 p.m. The second and fourth day pyramidon tablets were given them as follows: 0.3 gram at 5 a.m.; 0.1 gram hourly from 7 a.m. to 6 p.m. (total 1.5 gram). Ten of these patients, with serious destructive changes in their lungs, reacted to pyramidon. The twelve others, with very little disease (bronchial gland tuberculosis, slight fibrous changes, tubercle bacilli always absent) were not influenced by pyramidon. The test was furthermore carried out on four nontuberculous wounded soldiers with normal temperatures, and on two advanced cases of tuberculosis, also with normal temperatures. They were all uninfluenced by pyramidon. The author has so far tested his method on 60 subfebrile cases, and always with the same result. He comes to the conclusion that that temperature is a patient's normal temperature, which cannot be reduced by high doses of antipyretics. Subnormal temperatures are not considered here.—*Über eine neue Methode zur Beurteilung subfebriler Temperaturkurven im Verlaufe der Lungenberkulose, J. Hollo, Brauer's Beitr., z. Klin. d. Tuberk., August, 1916, xxxvi, 29.*

**Complement Fixation.**—The work reported covers 635 tests on 570 patients, fresh serum being used in every case. Antigens were made from living, virulent tubercle bacilli, ground up with sodium chloride. The results with various tubercle bacillus antigens show that in far advanced cases the greatest number of fixations were obtained with the antigen prepared by the author and with Petroff's methyl alcohol extract, both giving 70 per cent fixation. The sodium hydrate extract gave better fixation than Miller's antigen. In the moderately advanced cases the methyl alcohol preparation gave the best fixation (70 per cent); Miller's antigen gave 46 per cent and the sodium hydrate extract 45 per cent of fixations. Antigens from living, virulent, bovine tubercle bacilli according to the author's formula gave a high percentage of fixation, 52 per cent in 90 cases, while avirulent strains of tubercle bacilli showed a low percentage. Antigens from 6 strains of tubercle bacilli gave the highest percentage of fixation in the moderately advanced cases (82 per cent). The phenomenon is not a specific antigen-antibody combination but tends toward a group reaction. Next to the tubercle bacillus the other acid-fast organisms such as the smegma, the leprosy and Moeller's grass bacillus gave the higher degree of fixations. The Hecht-Weinberg-Gradwohl system when used with tubercle bacillus antigens gave a lower degree of fixation than the Wassermann test. Antigens prepared from the tubercle bacillus have a high anticomplementary titre and the close relation between the anticomplementary value and the antigenic dose causes difficulty. The sodium hydrate and methyl alcohol extractions of tubercle bacilli give high percentages of fixation, but both are prone to become anticomplementary, and the sodium hydrate preparation frequently has hemolytic properties. The emulsions of living virulent organisms give the best results if they are freshly prepared. Sufficient work has been done to show that a circulating antibody is present in the blood of a good percentage of tuberculous patients, although some do not show fixation with any antibody so far tested. The complement fixation test is not decisive, but a valuable adjunct in diagnosis.—*Complement Fixation in Tuberculosis, J. B. Rogers, J. Infect. Dis., August, 1920, xxvii, 101.*

**Vitón's Tuberculin Test and Treatment.**—The "Argentine method" of giving extremely minute doses of tuberculin has been repeatedly mentioned in American literature. Vitón insists that in applying the tuberculin test it is as important to avoid just as carefully an appreciable local reaction as a general febrile reaction, as both do serious damage. The optimal dose has to be determined tentatively for each individual. It is that which produces decided improvement in the focus, not an aggravation. This decided improvement in the focus and in the general condition is maintained by continuing the optimal dose until its effect is exhausted, and then increasing the dose a little. As statistics show that nearly every one of us is tuberculous, this infection must be a factor in many affections in which hitherto tuberculosis has not been incriminated. By this method of tuberculin treatment in extremely minute doses, this factor is eliminated more or less completely, and the system is then able to throw off the whole affection. Dilutions of the tuberculin from 1:100,000,000 to the figure with fifteen zeros are what he uses in the subacute and chronic rheumatism of Poncet, neuralgias, dorsal myalgias, disordered heart action, arhythmia and functional disturbances of various kinds without much impairment of the general health, and in all cases of mild impregnation with tuberculous toxins with little if any derangement of the metabolism. This is the "tolerant group" of patients. The "sensitive group" includes external glandular processes, paratuberculous dyspepsia, endocrine derangement (exophthalmic goitre, hyperthyroidism, ovarian disturbances, etc.), diabetes, neuritis, and lesions of the eyes. In this group he uses dilutions of the tuberculin with from fifteen to twenty zeros. The third group embraces asthma, tuberculous nephritis, mild tuberculous toxemia, and incipient apical disease. This group is treated with dilutions of from twenty-one to twenty-six zeros. The fourth group, the "hypersensitive," includes frankly febrile lesions and softening and cavity formation in the lungs. In this group he uses the tuberculin diluted to twenty-seven zeros. With these minute doses of tuberculin the organism is helped at once and not damaged at first before help is applied, as is the case with ordinary tuberculin treatment. He advises a tentative course of the kind in every pathologic condition which, contrary to expectation, shows no tendency to recovery under persevering classical treatment. Also in every slow chronic syndrome of whatever nature, and every pathologic condition for which no definite cause can be discovered. He has had great success in tuberculous affections of the eyes rebellious to all other measures, including tuberculin by the ordinary excessive dosage. It does not conflict with other treatment, and systematic prophylaxis by this means in jails, schools and factories might modify the predisposition to phthisis and thus ward it off.—*La prueba diagnostico terapéutica a la tuberculina y el método de las muy pequeñas dosis en tuberculino-terapia (prueba y método del autor), J. J. Vitón, Seman. Méd., April 22, 1920, xxxvii,* 545.

**Three Methods of Sputum Examination.**—At the laboratory of the United States Health Service Hospital No. 26, Greenville, S. C., 50 to 100 specimens of sputum are examined daily. The methods tested were: (1) direct smear examination, (2) the antiformin method, (3) the autoclave method. Direct smears were made by selecting the purulent particles for examination. With the antiformin method the reagent of 30 per cent strength was added to the sputum in centrifuge tubes, the volume of each being equal, and allowed to stand from ten to twelve hours, then centrifugated at a high rate of speed. Smears were made from the sediment. With the autoclave method thick smears were prepared from the coagulum obtained by subjecting the sputum to 15 pounds of steam pressure for fifteen minutes in an autoclave. All prepared smears were fixed by heat, stained with steaming carbol fuchsin, decolorized with acid alcohol and counterstained with a saturated alcoholic solution of picric acid. Gaffky's scheme for tabulating the average number of bacteria per field was used. The concentration of bacilli is slightly larger with the antiformin than with the autoclave method. Neither surpass the direct smear examination to any extent. Of 153 examinations by the direct method 3 were negative. Of a total of 170 by the antiformin method 8 were negative. Of a total of 170 by the autoclave method only 2 were negative. The autoclave method kills all tubercle bacilli. The material subsequently is safe and easy to handle. Where large numbers of specimens are to be examined this method is most convenient.—*A Comparison of Three Methods of Examining Sputa for B. Tuberculosis, L. R. Jones, J. Lab. & Clin. Med., October, 1920, vi, 1.*

**Viability of Acid-Fast Bacilli.**—In July, 1914, a batch of stock laboratory cultures of tubercle bacilli was placed in the ice chest of the City of London Hospital for Diseases of the Chest. War broke out, and the cultures were left untouched for nearly six

years. During most of the time the chest was not replenished with ice. The culture tubes were capped with rubber. In the spring of 1920 the cultures were examined again, with the following results: One stock culture of tubercle bacillus on Dorset's egg medium survived untouched for nearly six years, while two glycerin agar cultures had died out. The living culture was of feeble virulence, and owing to this fact it was not possible definitely to decide as to the type; but the lesions produced in a rabbit exclude the human type. There is no record of the culture's virulence previous to the war. A culture of B. phlei remained alive for four years and was still strongly acid-fast, while a culture of Rabinowitsch's bacillus of the same age was found to have died out, and to have lost to a great extent its acid-fast properties. In each case the Dorset's egg medium culture was the living one. The dead agar cultures were characterized by marked pleomorphism and considerable loss of acid-fast properties.—*A Note on the Viability of Acid-Fast Bacilli, S. R. Gloyne, Tubercle, October, 1920, ii, 12.*

**Symbiotic Growth of B. Proteus and B. Tuberculosis.**—In a series of experiments prior to 1914, the author noted that in cultures of B. tuberculosis, grown in symbiosis with B. proteus, a diphtheroid organism appeared, when every precaution was taken against contamination. The evolution of this organism was not constant, but in 97 experiments with tubercle bacilli under different conditions, 62 per cent were positive. The most favorable conditions seemed to be glycerine-veal-brain-agar cultures of tubercle bacilli, to which 5 per cent glycerine-peptone water was added to cover the growth, inoculated with B. proteus, at a temperature of 37°C. In all cultures of this kind the diphtheroid organism was observed, usually appearing in about ten days. A marked yeast-like odor was noted, and the B. proteus culture died out. Morphologically and culturally the diphtheroid organism was identical with the acne bacillus. A second more recent series of experiments confirmed these findings, the diphtheroid organism appearing in seven to fourteen days in all cultures grown by the same method. It is premature to draw any definite conclusions, but there is justification in assuming that the appearance of the third organism is not due to contamination, and that the experiments strengthen the theory that the acid-fast organisms and the streptothrices are closely related, and that at certain phases of their existence no sharp line of demarcation exists. —*Symbiotic Growth of B. Proteus and B. Tuberculosis; Appearance of an Acne-like Organism, E. T. Thompson, Lancet, July 24, 1920, ccix, 186.*

**Creosote and Derivatives in Tuberculosis.**—Despite the extensive use of creosote and related compounds in the treatment of tuberculosis, practically no evidence exists as to the susceptibility of the tubercle bacillus to these antiseptics, or as to their influence on tuberculosis in experimental animals. A series of experiments on the bactericidal power of these compounds gave the following results: Virulent human tubercle bacilli are inhibited from growth on artificial media containing 0.01 per cent, or 1 part in 10,000 each of resorcin, thymol, paracresol, orthocresol and metacresol; 0.05 per cent (1:2,000) of creosol and pyrocatechin; 0.1 per cent (1:1000) of guaiacol, creosote, hydroquinone and guaiacol cacodylate. Sodium guaiacolate inhibited completely at 1.7 per cent, and partially at 0.8 per cent. Thiocol did not inhibit in 1 per cent concentration, and styracol not in 10 per cent concentration (suspension). Tests to determine the capacity of the tubercle bacilli to grow on agar, after exposure to the antiseptic, showed that exposure of human tubercle bacilli to even 1 per cent solutions of pyrocatechin, hydroquinone and resorcin, and 0.5 per cent of cresol, for ten minutes to forty-eight hours, fails to kill them. Metacresol and paracresol kill in 1 per cent concentrations after exposure for one hour, but not after ten minutes. Orthocresol reduces growth after one hour and kills in six hours. Thymol kills in ten minutes in 1 per cent concentration, but 0.1 concentration does not kill even in forty-eight hours. In another series of tests the tubercle bacilli were exposed to the antiseptic, when in a thin layer, and viability determined by inoculating guinea pigs with the treated bacilli. Resorcin in 1 per cent concentration killed only after twenty-four hours exposure. Orthocresol killed in 1 per cent concentration in twenty minutes, but 0.5 per cent did not kill in twenty-four hours. Creosote and guaiacol killed most of the bacilli in 0.5 per cent concentration in twenty minutes, but 0.1 per cent concentration was not bactericidal in twenty-four hours. Thymol was bactericidal in 0.1 per cent concentration in twenty minutes, but 0.01 per cent was not bactericidal in twenty-four hours. Comparing these figures with those given by De Witt and Sherman for other antiseptics, creosote, guaiacol, and the cresols have about the same low tuberculocidal power as phenol. Thymol has a slightly greater bactericidal power than the other substances tested. Therapeutic tests were made on two groups of guinea pigs, one of which was injected with a highly virulent strain of human bacilli, the other with a less virulent one. The animals received several doses of the drug by the intracardiac, intramuscular, and subcutaneous routes, and

by daily feedings of pills containing the following drugs: creosote, guaiacol, creosole, thiocol, styracol, orthocresol, metacresol, paracresol and thymol. Apparently the animals injected with the less virulent tubercle bacilli showed more active tuberculosis than the controls. With the more virulent bacilli, the extent of the disease was perhaps slightly less in the treated animals, but they died a little earlier than the controls. The experiments indicate that the bactericidal power of the creosote series is low in vivo as well as in vitro. This does not mean that they may not have value in open tuberculous infections in man in which bacteria other than the tubercle bacillus are involved, but it does substantiate the opinion of careful clinical observers that creosote and guaiacol do not have a specific action on tuberculous infection.—*The Influence of Creosote, Guaiacol, and Related Substances on the Tubercle Bacilli and on Experimental Tuberculosis, L. M. De Witt, B. Suyenaga and H. G. Wells, J. Infect. Dis., August, 1920, xxvii, 115.*

**Silica as a Cause of Printers' Phthisis.**—In a letter to the *Times*, Mr. E. Halford Ross brings forward a new theory as to the causation of printers' phthisis. Early in 1918 he reported to the health committee of the joint industrial council of the printing trades that there was a concentration of hereditary predisposition to consumption in compositors owing to the "closeness" of their craft and to intermarriage within their families. About a year ago his suspicions fell on printers' list as a cause. It is a black, grimy, woolly, fluffy substance that collects in compositors' boxes, trays, cases and chases. It had already been examined by bacteriologists for the tubercle bacillus but found to be sterile. This was a peculiar fact and encouraged Mr. Ross to make a further examination. He then found that the list does not readily decompose like the dirt collected in rulers,' readers' and binders' rooms, which soon becomes musty and smells. Then he remarked its weight and realized that there was no object in looking for the tubercle bacillus in it, for the bacillus was already latent in the human subject. A chemical analysis was carried out. Samples of list were obtained from various works and sent unlabeled to chemists. They reported that the list from composing rooms contained both silica and iron in appreciable quantities; the list from machine rooms contained less. It is known that silica and the oxides of iron light up phthisis when inhaled continually by those predisposed to the disease. The condition of the lung produced by silica, which predisposes to phthisis, has been described as silicosis. One of the great printing firms of London has for some time used suction bellows on compositors' trays, cases and chases to remove the list.—*London Letter, J. Am. M. Ass., November 6, 1920, lxxv, 1280.*

**The Crippled Child. New Tuberculosis Methods.**—There is no more sorrowful sight in our modern life than the child afflicted with tuberculosis. The twisted back, the limbs swollen and contorted, the drooping head furnish so eloquent an appeal for help that the hardest heart may not resist it.

Any real progress in the treatment of such conditions deserves the widest acknowledgment. This progress is to-day a reality, as may be seen by anyone instructed in the treatment of surgical tuberculosis who visits the Lord Mayor Treloar's Home at Alton. The medical officer of this institution has devoted his life to the work. The upshot of that work may necessitate our abandoning the habit of speaking of "surgical" tuberculosis at all. For the truth would seem to be that the less surgery we employ the better the patient's chance of recovery.

It used to be urged that the surgeon should open up tuberculous disease areas in bones and joints and elsewhere. The idea was that by this means each focus of infection was dealt with and the general mass of infection was lowered. In consequence we had a very great development of what was called the surgery of tuberculosis, and indeed the name "surgical tuberculosis" was coined to differentiate these conditions from pulmonary tuberculosis or "consumption."

But a careful study, and, what is even more important, a careful following up of the cases after discharge from the home, have led to the idea that very often surgery does no good at all and that it may easily do a great deal of harm. The truth is that tissues which have been attacked by the tubercle bacillus become very weak and lose their resistance to such an extent that if any other germs reach them they fall an immediate and easy victim, and so a new infection is added to the old one. Surgery is apt to open the way for the entry of new germs. Wounds are made, they become infected, fever supervenes, and the child develops the "hectic" appearance which is associated not with tubercle itself but with a new infection superimposed on tubercle.

At Alton the methods of surgery have been largely dispensed with. Accumulations of fluid are removed, it is true, but only by aspiration, that is, by a fine hollow needle. Thus there are no wounds to become infected and the deadly "secondary infection" is avoided. The tubercle bacillus is

thus separated from its most dangerous "allies." It is then dealt with by making the human soil in which it flourishes as unsuitable as possible for its growth. Vaccines are not used as they have been found of little value. The child itself is the study. By rest, by the use of very clever and very original apparatus relieving the weak place from strain, by sunlight, by good food (but not "stuffing"), and finally, when the patient is better, by exercise and the stimulation of country surroundings the battle is won. You really play up the child against the germ, and given a decent chance the child wins. This is neither surgery nor bacteriology (though both may be employed as helps now and again); it is medicine in the best sense of that much abused word.

The work is revolutionary in its character. It owes much to the devotion with which it is being carried on and to the imagination which obtained the requisite site in Hampshire for the benefit of these suffering children.—*Editorial, N. York State J. Med., October, 1920, xx, 311.*

**Destruction and Repair in Pulmonary Tuberculosis.**—Variations in the clinical behavior of patients ill with active pulmonary tuberculosis are frequently indicative of their diminished resistance and the progression of their lesions. Such variations, though slight and apparently negligible, may be as important indications of progression of the disease as are similar variations of its conception. Such variations should suggest the importance of careful reëxaminations which frequently disclose retrogression of the lesion before the advent of more marked symptoms, and make possible helpful modifications of the management of the patient. Roentgen ray findings, and especially stereoscopic studies, should be employed in addition to physical examination. A few clinical and roentgenographic records are selected to illustrate these observations.—*Destruction and Repair in Pulmonary Tuberculosis, B. H. Waters, J. Am. M. Ass., October 30, 1920, lxxv, 1187.*

**Progress in Nephrectomy.**—This report comprises 207 nephrectomies performed at Mt. Sinai Hospital, New York City, since 1914 with a mortality of 3.8 per cent.

Renal tuberculosis forms the largest group in the series for which nephrectomy was performed: 92 cases with 2 deaths, a mortality of 2.1 per cent. There were 5 secondary nephrectomies; 3 of the operations were subcapsular. In two instances the disease was bilateral and the more diseased organ was removed. In general, the ureter was ablated as low down as possible, through the lumbar incision, phenolized and dropped back into the wound; complete excision of the ureter down to the bladder, through an anterior extraperitoneal incision, was practised ten times (approximately in 10 per cent of the cases). Its main indication is marked stricture formation at the lower end of the ureter. In a number of instances, the lumbar wound became tuberculous and broke down, weeks after the operation, whereas the anterior incision required for removing the ureter has never been so infected. The mortality following nephrectomy for tuberculosis has steadily diminished. In 1902, in the hands of well known surgeons, the fatalities numbered between 18 and 20 per cent. More recent statistics are given in the accompanying table.

*Fatalities in renal tuberculosis*

| | *Nephrectomies* | *Mortality Per cent* |
|---|---|---|
| Frank | 1,331 | 9.3 |
| Legueu and Chevassu | 1,539 | 5.9 |
| Israel | 1,023 | 12.9 |
| Albarran | 118 | 3.3 |
| Wildbolz | 139 | 2.8 |
| Zuckerkandl | 104 | 7.7 |
| Braasch (Mayo Clinic) | 532 | 1.3 |

The unquestionable value of cystoscopic and functional examinations in lowering the mortality is especially noticeable in the reduction of the death rate from uremia. Pousson, in a series of 435 nephrectomies performed a number of years ago, reported 128 deaths, 51 of which were due to renal insufficiency. This at present is one of the most infrequent causes of death. Legueu and Chevassu reported 1,539 nephrectomies, with 43 deaths, 12 of which were due to uremia. The most common causes of death following nephrectomy for tuberculosis, in order of frequency, are myocarditis, pneumonia and embolism. Tuberculous meningitis, although mentioned by some authors, is a very infrequent cause of death.—*Progress in Nephrectomy. A Study Based on a Series of 207 Cases, E. Beer and A. Hyman, J. Am. M. Ass., October 30, 1920, lxxv, 1180.*

**Subcutaneous Emphysema in Acute Pulmonary Affections.**—Subcutaneous emphysema in the course of acute respiratory affections is rare in adults and in itself not serious, the prognosis depending entirely upon the underlying disease. The emphysema is at first interlobar and subpleural, then mediastinal and lastly subcutaneous. When it occurs in the course of pulmonary tuberculosis, it is generally of grave significance.—*De l'emphyseme sous-cutané dans les affections pulmonaires aigues non tuberculeuses chez l'adulte, Ch. Roubier, Progr. Méd., October 9, 1920, 439.*

**Knee Joint Tuberculosis in Children.**—Open air, sunshine, tonics, nourishing food and congenial and at the same time sensible surroundings should be insisted on in the treatment of this condition. The keynote to local treatment is conservatism. If treatment is instituted early and the proper means are taken to prevent the development of deformities, the management is easy. The patient coming late with subluxation and knock-knee and external rotation of the tibia is, on the other hand, most difficult to treat. A properly applied plaster of Paris cast affords excellent fixation. The ordinary stiff legged brace, in mild cases, is often sufficient. In the more acute cases rest in bed with extension may be necessary and when the patient is allowed to be up, a plaster of Paris cast is indicated, with a high soled shoe on the opposite foot and crutches to prevent weight bearing. The Thomas extension splint is excellent, but unless guarded against is especially prone to cause a relaxed knee joint. As the condition improves, a walking caliper Thomas splint may be used. All apparatus must be supervised carefully and care taken once the flexion is overcome to prevent genu recurvatum. When subluxation is present, more elaborate measures are necessary. Prolonged traction with weight and pulley, with the line of pull carefully directed, may straighten the knee. At the first indication of a tendency to further subluxation, the force should be stopped and a cast applied with the flexion deformity only partially corrected. This may be repeated and usually the knee can be brought straight in three or four attempts. The knee must never be moved back and forth, but merely forced straight to the point where it seems safe. It has never been the custom in the Mayo Clinic to resect tuberculous knees in children.—*Tuberculosis of Knee Joint in Children, M. S. Henderson, Minn. Med., October, 1920, 111, 463.*

**Ileus in Course of Tuberculous Peritonitis.**—Aimes comments on the small number of such cases on record, ascribing this to the nonrecognition of the true cause of the ileus in many cases. In the 68 operative cases he has compiled, 23 of the patients were under 16; 45 of the 68 recovered. The immediate mortality was 55 per cent, and the total mortality within a year was 63 per cent. The death rate was only 27 per cent in the cases in which intervention was restricted to cutting adhesions binding down the bowel. If the peritonitis is healed, the entire abdominal cavity should be explored to discover adhesions. With a florid peritonitis, simple exposure to the air may cure paralytic ileus, or the feces can be manipulated through the contracted segment, or profuse irrigation with heated serum may cure. The agglutinated mass of intestines was resected in one case, the patient dying. The 3 patients treated with anastomosis all recovered. Canessa injected 10 liters of oxygen into the abdominal cavity, with the recovery of the patient. Even in apparently the most desperate cases, cautious surgical intervention may prove successful.—*L'occlusion intestinale au cours de la péritonite tuberculeuse, A. Aimes, Rev. d. Chirurg., 1920, xxxix, No. 3, 177.*

**The Dissemination of Tuberculosis Among Cattle.**—Statistics of the number and percentage of cattle reacting to tuberculin and of those showing tuberculosis upon meat inspection are given for Belgium, Great Britain, France, Italy, Pyrenese Peninsula, Balkan Peninsula, Russia, Finland, Asia, Australia, North America, Central and South America, and Africa. Tuberculosis is disseminated among the cattle of all civilized countries. It is the most widely disseminated cattle disease. Its occurrence is intimately related to the development of intensive agriculture and the problem of a natural comfortable mode of life. That the keeping of cattle in stalls favors the development of tuberculosis is seen from the experiences of the white cattle of the steppes. As long as these remained on the steppes they developed no tuberculosis, but when placed for one-half year before slaughter with the cattle of the cultivated breeds in stalls, they became victims of tuberculosis. On the other hand when set free upon the pastures an arrest of the disease takes place as happened in America. Frequent change from land to land predisposes to tuberculosis. Among the cattle of the American prairie, the Bukowinian cattle and those of the Polar regions, the north of Sweden and Norway, those of Algeria, Arabia, North Africa, the Russian steppes, Iceland, Sardinia, Sicily and Japan, tuberculosis is only occasionally seen, if seen at all. On the other hand, in western Europe, in the thickly populated areas, in the vicinity of the large cities and the larger agricultural areas where milk is intensively produced, tuberculosis is widely disseminated among the cattle and is found to be steadily increasing. The inferior breeds are infected to a greater extent than the selected breeds. However one cannot speak of a racial (breed) immunity among cattle inasmuch as living conditions will often render the nonsusceptible susceptible to tuberculosis. Liability to infection of course plays the dominant part in the occurrence of the disease, and incidence

of infection increases with the years of life. More than half of the tuberculosis in cattle occurs after the sixth year. The cow becomes tuberculous more often than the bull. This is due probably to the weakening influence of milk production and reproduction. Feeding influences the morbidity. Feeding of the byproducts from distilleries, breweries, sugar refineries, etc., has a weakening effect and hence favors the development of tuberculosis. In the neighborhood of foundries, cattle are exposed to respiratory diseases and indirectly to tuberculosis. Climatic conditions favoring the catching of colds predispose to it, as well as sudden changes to a different environment and a different mode of life.—*Die Verbreitung der Tuberkulose unter den Rindern, W. Seifert, Zeitchr. f. Tuberk., August, 1920, xxxii, 283.*

**Prophylactic Vaccination of Cattle against Tuberculosis.**—When bovine tubercle bacilli are cultivated on glycerine-bile media in long successive series, a race of attenuated bacilli is obtained, which have become avirulent for cattle, monkeys and guinea pigs. They can be injected in considerable doses intravenously without producing tuberculous lesions, but they confer, commencing the thirtieth day after inoculation, a durable resistance against intravenous test inoculations. The tolerance of the animals against this avirulent strain also manifests itself in the fact that they remain well when they are placed in close contact with tuberculous cows in infected stables. This protection from one single vaccination lasts eighteen months, but can be maintained indefinitely by yearly revaccinations which are in themselves harmless. The authors recommend that their method be tested out on a large number of animals over a period of years corresponding to the average duration of life of these animals.—*Nouvelles recherches expérimentales sur la vaccination des bovidés contre la tuberculose, A. Calmette and C. Guérin, Ann. de l'Inst. Pasteur, September, 1920, xxxiv, 37.*

**Camphor in Hemoptysis.**—Hemoptyses are of two kinds: (1) those due to a damming up of the blood, and (2) those due to the rupture of a vessel. In the first, the bleeding comes on slowly and with little froth. The blood is usually dark brown. The cause is a circulatory insufficiency of cardiac or vasomotor origin. In the second, the bleeding comes on rapidly and with much froth. The blood is usually red. Camphor is small doses stimulates the heart and mildly the vasomotor centre. The pulse volume is increased and there is a larger variation between systolic and diastolic pressure. This insures a better flow of blood through the lungs. In large doses camphor causes a dilatation of the peripheral vessels with an increased blood supply and by its action on the vasoconstrictor centre causes constriction at the seat of injury, thereby inviting local thrombosis. Aside from its principal mechanical action camphor secondarily produces an increase in the thrombokinase flowing to the part.—*Lungenblutung und Kampferwirkung, K. Lehner, Zeitchr. f. Tuberk., August, 1920, xxxii, 276.*

**How to Arrest the Disease and Avoid Invalidism.**—The total percentage of the tuberculous who secure an arrest or healing of their disease, whether treated in the home, the dispensary or the sanatorium, is disappointingly small. Of those who are pronounced arrested or healed the number who relapse is large. Of those who remain well as far as their tuberculous infection is concerned, a large number are in a state of invalidism. Tubercles undergo much the same type of evolution that is noted in a boil, that is, implantation followed by induration, necrosis, rupture and healing, but the changes take weeks, months or years instead of a few days. The fact that practically all patients who manifest their clinical symptoms in adult life have been in stages alternating between activity and arrest, should suggest the possibility of healing in a large proportion of early clinical cases. Sanatoria and dispensaries are filled with advanced cases. Specialists are spending most of their energy fighting a losing fight with patients far advanced in the disease. The tuberculous man must not be permitted to become a consumptive. Most laymen and many medical men do not realize that months, at times years, intervene between different periods of activity. If active disease does not follow at once they often assume that the diagnosis was in error. Hygienic working colonies should be provided for the patients with arrested disease who are financially dependent. The length of time required for the pathological process to heal is far longer than is usually believed. In early cases it may take two years or more. Relapses usually occur three to nine months after the patient leaves off treatment. Pottenger treats his patients until physical exercise such as walking from one to ten miles produces no toxic symptoms. The patient is then allowed to interrupt treatment for three to nine months with only occasional supervision. He then returns for another period of strict guidance. In far advanced cases a second period of rest is followed by a third period of strict guidance. To prevent invalidism patients must

be told what they can do, not what they cannot do. The patient's nervous and psychical equilibrium, and his physical vigor and resistance must be restored before he is discharged.—*How May the Tuberculous Patient Secure an Arrestment and Avoid Becoming an Invalid? F. M. Pottenger, N. York M. J., September 18, 1920, cxii, 389.*

**The Determination of the State of Immunity in Prognosis and Treatment.**—When centrifugalized blood serum is carefully added to a 10 per cent solution of tuberculin in physiological saline solution containing 0.5 per cent phenol, a precipitate or clouding may or may not take place at the junction of the two liquids. The reaction is tested in small pipettes and 0.5 cc. of each fluid is used. Care must of course be taken not to mix the two fluids. After incubation at 37°C. for twenty-four hours the reaction is studied and one of the following phenomena is noted at the junction of the two liquids: (1) A thick disk-like precipitate. (2) A flocculent ring-like clouding or a suspended focculent precipitate. (3) A slight clouding or translucency. (4) No change. Number 1 is termed a strongly positive or two plus reaction; 2 a slightly positive or one plus; 3 a questionable or plus minus; and 4 a negative reaction. The reaction is termed *immunity reaction* (*I. R.*). The substance causing the reaction is probably analogous to the precipitins or to the alexins. In the same individual the reaction usually remains the same under ordinary circumstances. The lack or presence of the protective substance is inherited. Its lack means a susceptibility to tuberculosis or tuberculous intoxication and is the cause of inherited or acquired tuberculous predisposition. In pregnancy and acute infectious diseases (pertussis, measles) the protective substance is inhibited. Malaria, chronic Bright's disease and pueumonia give a two plus reaction. Lues gave a two plus reaction with but one exception. In three cases of psoriasis the reaction was weaker than usual. In severe anemias there was a sudden drop in the intensity of the reaction. The *prognostic index* (*P*) is determined from the *Immune Reaction* (*I. R.*), the cutaneous tuberculin or *Sensibility Reaction* (*S. R.*), the presence or absence of tubercle bacilli, and the physical findings. From these factors a table of nine indices is made as follows:

| SERUM REACTION (I.R.) | CUTANEOUS SENSITIVENESS (S.R.) | TUBERCLE BACILLI, CLINICAL FINDINGS | PROGNOSTIC INDEX | QUALIFICATION OF THE CASE | PROGNOSIS |
|---|---|---|---|---|---|
| ++ | 0 | 0 | 1 | Nontuberculous with good resistance | Not susceptible to tuberculosis |
| + | 0 | 0 | 2 | Nontuberculous with weak resistance | Some susceptibility to tuberculosis |
| ± | 0 | 0 | 3 | Nontuberculous with very weak resistance | Susceptibility to tuberculosis |
| − | 0 | 0 | 4 | Nontuberculous with no resistance | Great susceptibility to tuberculosis |
| ++ | + | − or + | 5 | Tuberculous with good resistance | Tendency to spontaneous healing. Process not progressive. Retrogression likely |
| + | + | − or + | 6 | Tuberculous with weak resistance | Some tendency to spontaneous healing. Process not progressive. Retrogression doubtful |
| ± | + | + or − | 7 | Tuberculous with very weak resistance | Poor tendency to spontaneous healing. Process progressive. Retrogression not looked for |
| − | + | + or − | 8 | Tuberculous with no resistance | No tendency to spontaneous healing. Process progressive |
| 0 | 0 | 0 | 9 | Tuberculous with no reaction and resistance | Spontaneous or artificial immunization out of question. Body does not react. Process progressive |

Those with indices 1, 2, 3, 4 may be looked upon as not having tuberculosis but their future liability to the disease is less the stronger their prognostic index and the stronger their immune reaction. In order to increase the immunity reaction emulsions of dead tubercle bacilli are given subcutaneously, intramuscularly or intracutaneously according to certain indications derived from the patient's condition, The Hollaender-Richter tuberculosis vaccine (*H. R. V.*) is the preparation employed, a description of which is given. Those with indices 1 and 5 need no immunization. Those with index 9 should not be given the vaccine, for the body apparently is overwhelmed by the intoxication. The vaccine (per cc.) is employed in the following dilutions:

| | |
|---|---|
| 1. = 1 mgm. | 6. = $\frac{1}{32}$ mgm. |
| 2. = $\frac{1}{2}$ mgm. | 7. = $\frac{1}{64}$ mgm. |
| 3. = $\frac{1}{4}$ mgm. | 8. = $\frac{1}{128}$ mgm. |
| 4. = $\frac{1}{8}$ mgm. | 9. = $\frac{1}{256}$ mgm. |
| 5. = $\frac{1}{16}$ mgm. | 10. = $\frac{1}{512}$ mgm. |

Those with indices 2 or 6 are treated with strength 10.

Those with indices 3 or 7 are treated with strength 9.

Those with indices 4 or 8 are treated with strength 8.

The amount of vaccine given is determined by the body weight, which, figured in kilograms and divided by 100, will give the first dose expressed in cubic centimeters. Thus a man of 58 kg. will receive in volume 0.58 cc. From the local reactions graded into four stages the subsequent doses are determined. Stage 1 (−) is accompanied by no symptoms; 2 (+) has a transient local swelling, disappearing before the next injection; 3 (++) has a lasting, hard, nodular infiltration; 4 (+++) has local necrosis, destruction of tissue and pustulation. With a one minus local reaction the dose is increased, with a one plus the dose is repeated, with a two plus the dose is reduced and with a three plus reaction no further injection is given for six months when the prognostic index is redetermined. The second injection is given two weeks after the first, the third three weeks after the second, the fourth four weeks after the third, etc. Injections are continued until the *immune reaction* (*I. R.*) is two minus as in prognostic indices 1 and 5. Immunization must not be considered in a clinical sense. The physical findings, including tubercle bacilli and temperature, may show no change, but the power to withstand the disease may have been recovered. The vaccine is contraindicated in (1) those with a prognostic index of 1, 5 or 9; (2) those with a daily maximum of 100.2° F.; (3) infiltrative-pneumonic types (Fraenkel-Albrecht classification), that is, with cavity formation, septic-pyemic symptoms, high fever, profuse hemoptysis, cachexia and laryngeal or intestinal tuberculous complications, and (4) hematogenous, disseminated tuberculosis and tuberculous meningitis.

*Summary:* Three new things have been presented. (1) "Immunity reaction" and "prognostic index." (2) A method of therapeutic and prophylactic immunization. (3) The substance or vaccine to be used. Statistical evidence is not furnished here but will probably be furnished later. The *H. R. V.* preparations may be obtained for experimental purposes from the Budapest Jenner-Pasteur Institute.—*Die Feststellung der Immunisierung zur Vorbeügung und Behandlung der Tuberkulose, H. Hollaender, Zeitschr. f. Tuberk, August, 1920, xxxii, 257.*

**Training of the Tuberculous.** The subject of the tuberculous sufferer is a complex one. There is ample room for experiments. Patients who are under twenty-two years of age, and whose occupation is of a kind known to have a high mortality rate from tuberculosis should change their occupation. A "light place in the country" so often advised by the tuberculosis officer is practically nonexistent. Agricultural work is highly skilled and extremely arduous, With arrested disease patients over twenty-two should be advised to go on with their occupation when the latter is definite and lucrative. The large class of those who improve, but can never be pronounced arrested, are only fit to work under restrictions. The discharged tuberculous soldier does not want to work. Sanatoria should be urged to employ ex-patients in every possible capacity. Cabinet making, watch and clock repairing and cleaning, boot repairing, toy and jewelry making and the management of village shops are suitable occupations for the male consumptive, as they allow him to be his own mas er and to work when he is able. Dress making, lace making, embroidery and domestic work are suitable for the women. Some advanced cases can do a certain amount of work, namely the usual work of the institution and the simpler part of the particular industry in which the sanatorium is engaged.—*The Training of the Tuberculous Sufferer, J. H. Walker, J. State Med., June, 1920, xxviii, 185.*

**Occupational Therapy.**—The chief aim of occupational therapy is its psychic effect. It is applicable to all stages of tuberculosis. It diverts and hardens. It stimulates the appetite and induces a healthy frame of

mind. To this psychic benefit is added the important function of the production of specific poisons by autoinoculation, as soon as controlled exercise is included in the regimen. The activities of the Boston Consumptives' Hospital are religious, diversional and occupational. There are newspapers, magazines, a circulating library, moving pictures, checkers, chess and cards. Tobacco in moderation is permitted. Ambulatory patients are engaged in reed and raffia work, basketry, weaving, bookbinding, jewelry, chair caning and crochet work. Eleven patients with positive sputum, four of whom had cavities, were employed as orderlies. All of them improved, most of them gained in weight. Remuneration of the patients' work is an important factor in keeping them interested.—*Occupational Therapy for the Tuberculous, F. H. Hunt, Boston M. and S. J., September 16, 1920, clxxxiii, 356.*

**The Lungs under the Influence of Artificial Pneumothorax.**—One of the chief objects of this article was to see whether artificial pneumothorax could be employed on incipient cases. As a result of his experiments Tomaczewski found: (1) The compression of the lung succeeds better with the rabbit than with the dog. (2) As a rule, it is not uniform, inasmuch as in the majority of cases the upper lobe is most strongly compressed. (3) Under its influence changes of inflammatory character develop in the lung: small-celled infiltrations develop pretty early around the blood vessels and bronchi, which in the later stages assume the character of granulation tissue; in the dog they appear in smaller number. In the pleura thickenings develop which in early stages consist of granulation tissue and later of striped connective tissue penetrating into the parenchyma of the lung. These changes are much more pronounced in the dog than in the rabbit, and in like measure affect all the lobes of the lung of the compressed side. The blood content of the compressed lung is small, and the lymph vessels are dilated. The changes in the parenchyma of the lung are probably chiefly of pleuritic origin. (4) In the noncompressed lung no changes are found except hyperemia and vicarious emphysema. Artificial pneumothorax in rabbits does not alter the favorable conditions for the development of the infection, when tubercle bacilli are injected intravenously. Since we never know with certainty which form of tuberculosis is mild, and whether a case will be arrested or cured by dietetic and general measures alone, it seems that cautious attempts to treat incipient stages with pneumothorax are completely justifiable.—*Histologische Veräderungen der normalen und mit Tuberkulose infizierten Lunge unter dem Einfluss des künstlichen Pneumothorax. L. Tomaczewski, Beitr. z. Klin. d. Tuberk., August, 1916, xxxvi, 1.*

**Results of Pneumothorax Treatment.**—Since December, 1906, 430 patients were treated at the Vejlefjord Sanatorium, Denmark, with about 10,000 insufflations in all. Except two cases of sudden death in 1910 and 1912 there have been no accidents from the induction of the pneumothorax. After-histories of patients discharged from 1907 to 1916 show that in 275 collapse treatment had been tried. Six of these were nontuberculous. All but 2 were in the third stage of tuberculosis and had positive sputum. In 85 cases efficient pneumothorax treatment could not be obtained because of technical difficulties. These are the controls. Of the technically effective cases, after three years, more than 40 per cent, and after seven years, 32 per cent were still able to work. The parallel numbers of the control cases were 21 and 16 per cent. Cessation of a pneumothorax is always a risk. When the cases are well, injections of gas every second or third month will be sufficient. The treatment is continued for about five years. If all is then normal, the lung is allowed to expand, the patient being observed very closely for the first few months. Injection of gas is renewed if symptoms of relapse appear, which is rare. The best results were obtained by a combination of pneumothorax with strict sanatorium treatment.—*The Results of Pneumothorax Treatment of Pulmonary Tuberculosis, C. Saugman, Lancet, October 2, 1920, cxcix, 685.*

**Pleural Obliteration Complicating Pneumothorax.**—Contraction of the pleural cavity down to obliteration following effusion is an unfavorable termination of artificial pneumothorax. It is illustrated by the following case: A barber, aged seventeen, in the third stage of tuberculosis, received left-sided N insufflations from June, 1915, on. The temperature became normal in a month and the sputum very much diminished in quantity. In August the temperature rose to 101° and a small left serous effusion was found. At the succeeding refill 390 cc. of N changed a mean pressure of −11 to one of +3.5, whereas formerly it took 520 cc. to convert −9 into +3. In September the patient began to get up and take exercise. The condition remained excellent until October 16 when another small serous effusion was found. On October 23 positive pressure was discovered although no refill has been given for a fortnight, when the mean pressure had been left at −2.5. The

whole left pleural cavity was contracting, and by February, 1916, moist sounds were audible over the left upper lobe. The temperature rose and all dilating efforts failed. Extrapleural thoracoplasty was performed July, 1916. The patient died during the operation, which was in all probability due to the general anesthesia. The etiology of this complication is concerned with that of effusions in general, which, aside from sepsis, are due primarily to the tubercle bacillus. The most generally invoked contributory cause is exposure to cold. Thoracentesis and replacement of the fluid with gas or air are useless in the long run. Extrapleural thoracoplasty is necessary to maintain lung collapse. It should be performed under local anesthesia.—*Pleural Obliteration: A Complication of Artificial Pneumothorax, W. C. Rivers, Lancet, July 31, 1920, cxcix, 244.*

**X-ray an Essential Guide for Pneumothorax.**—Before pneumothorax is produced the following points should be studied: (1) The extent of the lesions, especially as to cavities. (2) Will the opposite lung be able to furnish sufficient pulmonary tissue after the affected lung has been collapsed? In unilateral cases there is no question of the advisability of the treatment. In advanced bilateral cases the patient is probably going to die. The cessation of cough, control of hemorrhages and lessening of toxemia outweigh the risk taken in throwing an additional burden on the small amount of uninvolved lung tissue remaining. (3) Adhesions and fibrinous pleurisy must be considered, as a lung firmly adherent to the parietal pleura cannot be collapsed. If these bands are not too strong, their gradual tearing loose can be watched by the X-ray as the treatments are continued. In the last three months 453 X-ray examinations were performed at the United States Army General Hospital, Ft. Bayard, N. M. Three cases are cited which had been given up as hopeless. Two of them were bedridden for almost a year; after repeated injections of air they have become able to walk about the hospital grounds to a limited extent. A patient who was discharged in 1914 with artificial pneumothorax on one side, and an inactive tuberculosis in the other lung returned in May, 1920, after having worked constantly without any other bad result than the collection of about 2000 cc. of fluid in the chest. The possibility of acceleration of the tuberculous process in the opposite lung must not be forgotten.—*The X-ray as an Essential Guide for Producing Artificial Pneumothorax in Advanced Clases of Pulmonary Tuberculosis, D. D. Krupp, N. York M. J. October 30, 1920, cxii, 18.*

**Roentgen Ray Treatment of Surgical Tuberculosis.**—Iselin analyzes the experiences at Basel, 1907-1914, with 1133 cases. They confirm the possibilities of conservative treatment, especially the extraordinarily favorable prognosis under roentgen ray treatment. It is useful as an adjuvant to operative measures. Iselin is a surgeon, not a radiologist, but he regards well planned roentgen ray treatment as a fine foundation for conservative treatment. Old tuberculous processes yield earlier and more completely to the rays than young and active ones. The efficacy of the rays is seen particularly in the disappearance of tuberculous lesions in glands, omentum, soft parts and joints, of many years' standing, and by the reduction of the virulence of the pus from abscesses in experimental lesions. The ambulatory treatment and the noninterference with the earning capacity compensate for the length of the course.—*Röntgenbehandlung der chirurgischen Tuberkulose, H. Iselin, Schweiz. med. Wchnschr., June 17, 1920, lx, 499*

**Appliance for Simultaneous Irrigation and Radiation.**—Pus, mucus and cellular debris in wounds interfere with the penetration of the ultraviolet rays and therefore hinder their healing effects. Accordingly, an applicator is devised to cleanse the areas to be radiated and simultaneously to apply the rays. Five types of quartz applicators are shown, differing only slightly in construction and all easily attachable to the Kromäyer lamp. The rays are reflected by the walls of quartz, as well as by the surface of the water, so that no interference to their passage occurs. The flow can be regulated by pressure on the rubber tube leading to the applicator. An inverted mirror made of platinum-iridium can be used to increase the total reflection. The applicator is very useful in treating abscess cavities of any sort, fistulae, and uterine and vaginal affections.—*Der Quartzspüler. Ein neues Prinzip in der Ultravioletbehandlung, H. Ladebeck, Deutsche med. Wchnschr., September 16, 1920, 1055.*

**Treatment with Monochromatic Light.**—In view of the varying behavior of the rays in different parts of the spectrum, attempts were made to construct monochromatic lights with maximum amounts of energy. Two were made; the one liberating rays extending from the yellow far into the ultrared with the maximum energy in the ultrareds, and the other consisting of only the red and yellow rays. The first liberates a reddish-yellow light with great heat; the second, called a Neon lamp, emits a cold,

bright red light. The author has employed these lights since 1914 upon hundreds of patients. The Neon light has a sedative action and causes inflammations to disappear rapidly; edema and swellings vanish; secretions dry up; pus is diminished, and itching and paresthesiae are controlled. Rheumatic conditions are well suited for treatment; here pain is quickly lost. The technic is simple. The diseased area is exposed for twenty minutes to one hour as near to the lamp as possible. In cutaneous affections bandages should be worn between exposures to avoid the irritating effect of the daylight. —*Uber monochromatische Lichtbehandlung, F. Nagelschmidt, Berl. klin. Wchnschr. August 16,* 1920, *783.*

**A New Neon Lamp.**—The advantages of this new lamp are that it carries an exceptionally strong current and is very practically constructed for local lesions, such as wounds and circumscribed skin diseases. It can even be placed directly into a wound. This is possible because of its aseptic construction. It emits an intense yellow light in wave lengths from 740 to 580 microns.—*Eine neue Neon Lampe, Axmann, Deutsche med. Wchnschr., September 16, 1920, 1056.*

**Effect of Ultraviolet Therapy upon Metabolism.**—Patients, who show a urea nitrogen that is one-half that of the total nitrogen reveal, after several months' exposures to the mercury-quartz light, an increase of 30 per cent in the urea nitrogen. Diabetics show increased oxidation, having as much as 85 per cent urea nitrogen; and therefore should not be treated with ultraviolet exposures until there is a more normal chemical balance. The blood sugar, as well as the urine, must first be normal. Ultraviolet rays have an important therapeutic value. Before applying them the writer studies the blood chemistry of his patients, as well as the urinary, blood, blood-pressure and heart efficiency. Cellular protoplasm absorbs the ultraviolet rays. Exposures properly graded give the changes of sunburn. An overdose of the rays produces fatigue, exhaustion, low blood pressure, chilliness and symptoms of shock. It is necessary to know the exact strength of the quartz burner, its distance from the patient, the time of exposure and the patient's reacting power. Radiating the spinal area will especially help the muscles, secretions and organs supplied by the sympathetic nervous system—*Quartz Ultraviolet Therapy and Kinetic Energy, D. McCaskey, N. York M. J., December 27, 1919, cx, 1058.*

**Codliver Oil in Tuberculosis.**—Old-time medical men believed and preached that codliver oil was a cure for consumption, and this view was held for many years, in fact, until what may be termed the modern school of bacteriologists arose. Those of this school, who made a special study of the bacteriology of tuberculosis, treated with scorn the time-honored idea of codliver oil exerting a curative effect on tuberculosis. It was stated didactically and dogmatically that codliver oil was a food and nothing more and that all it did was to build up the body and to increase the resisting powers against disease. Anyone who argued to the contrary did not know what he was talking about. However, certain recent experiments appear to show that, after all, the doctors of years gone by were not so very far wrong. Dr. J. C. McWalter, in a letter to the *Medical Press and Circular* of September 8, points out that Sir Leonard Rogers and others experimenting on certain oils as regards their influence on cancer, have demonstrated that codliver oil has a specific effect on tubercle and on other acid-fast bacilli, like those of leprosy. But, granting that codliver oil can kill tubercle bacilli, McWalter asks whether it really does get at them in their snug alveolar retreat. Other recent experiments, however, seem to prove this very point, at least, that oils, when taken by the stomach, find their way into the lung tissue and stimulate defensive cell formation there. In a letter to the same journal for September 15, 1920, Dr. John Knott says that the administration of fat to tuberculosis subjects suggested itself to primitive reasoning, but the victim of that fell disease loathed fats, congenitally, and utterly failed to assimilate them physiologically. Saponification was shown to be an essential step in the digestion of adipose material and codliver oil was found to be the most easily saponifiable. Therefore, the therapeutic effects of codliver oil in the treatment of tuberculosis at the present time seem to be that it probably really has a specific action on the tubercle bacilli, that of course it has a food value, a flesh-forming and thus a fortifying effect, and lastly, that methods have now so diminished its nauseating features that it is amenable to the influence of the gastrointestinal fluids; that is, that it can be digested by the tuberculous with fair facility.—*Editorial, Med. Rec., November 6, 1920, xcviii, 778.*

**Food Values in Tuberculosis.**—Tuberculous patients require more food than the average amount needed by the ordinary laborer. The minimum for patients (almost

all adults) at the Gateford Sanatorium is 3500 calories. The diet must be rich in protein and fat; protein, 4 to 4½ ounces per head per day; fat, 4 ounces per head per day. The fat should be largely animal fat, particularly in the form of milk and milk products. If margarine is used it should be oleomargarine and not made from vegetable fats. Eggs should be in the dietary. When they are not supplied their place should be taken by an extra amount of meat, given according to accurate calculations. Whole meal bread, beans, peas, and lentils should always be used, together with a plentiful supply of fresh fruits and vegetables. Each patient requires two pints of milk per day.—*Some Remarks on Food Values in Tuberculosis, H. de C. Woodcock, Lancet, October 23, 1920, cxcix, 842.*

**Chaulmoogra Oil and Tuberculosis.**—The recent widely circulated statement that the U. S. Public Health had found that chaulmoogra oil was as efficacious in the treatment of tuberculosis as it had been shown to be in that of leprosy is said by Surgeon General Cumming to be unwarranted. Experiments made some years ago with the oil gave no definite results. Recent experiments with the ester or derivatives have been begun because of hopes based on some similarities between the bacilli of leprosy and those of tuberculosis; but these have not proceeded far enough to indicate what results will be obtained.—*Health News, United States Public Health Service, December, 1920.*

**Mercurochrome and Mercurophen in Experimental Tuberculosis.**—Mercurochrome-220 (a mercury compound of fluorescin) inhibits the growth of the tubercle bacillus completely in a dilution of 1:5000 and kills in a dilution of 1:100 in twenty-four hours. Mercurophen (sodium oxymercury-orthonitrophenolate) inhibits growth in a dilution of 1:50,000 and kills in a dilution of 1:10,000 in twenty-four hours. There was but little beneficial action from either of the drugs on experimental tuberculosis of guinea pigs. Still, it seems possible that mercurophen might be used with benefit in lupus and in ulcerating tuberculous conditions of the throat, larynx or bladder that are accessible to local treatments.—*Action of Mercurochrome-220 and of Mercurophen. A Preliminary Report of Effects on the Human Tubercle Bacillus and on Experimental Tuberculosis in Guinea Pigs, Lydia M. DeWitt, J. Am. M. Ass., November 20, 1920, lxxv, 1422.*

**Quinine in Hemoptysis.**—Strobel reports favorable results from the administration of five grains of quinine every four hours for a week in cases of hemoptysis. Assuming that the theory of mixed infection was the correct explanation of hemoptysis, he injected into 54 rabbits subcutaneously 0.5 cc. of fresh, bloody sputum from as many different patients during different seasons of the year. The result was that in 51 of the rabbits lobar pneumonia and pneumococcic septicemia developed, in 2 a localized tuberculous abscess, and in one an abdominal abscess. Five of the 51 rabbits were controlled by a rabbit of similar weight, receiving a similar inoculation, but which had been given fifteen minutes previously one grain of quinine bisulphate intravenously. These controls were killed after two to three months, when they presented all organs and blood free from tubercles and diplococic pneumonia.—*Quinine in the Treatment of Hemoptysis, J. E. Strobel, Med. Rec., August 21, 1920, xcviii, 313.*

**Liquid Acid Nitrate of Mercury in Lupus.**—Liquid acid nitrate of mercury is an efficient caustic remedy in the treatment of lupus. It is freely painted by means of a cotton swab on the affected areas, and with firm pressure for one or two minutes, and with care to limit the application exactly to the lupus patches, isolated nodules or ulcerated surfaces. In the case of isolated nodules or nonulcerated patches, the effect of the application is seen after a minute or two by the change in the appearance of the typical lupus tissue to a dry, opaque, yellowish-white. No dressing is applied and the patient is seen again in a week. The lesions then are covered with a thin brownish crust. This falls off in a few days and either leaves the affected areas completely healed or presents a shallow ulcer which heals rapidly. In some cases a single application is sufficient. In others isolated nodules remaining in the scar necessitate repeated applications. The applications are only slightly painful, but they are followed by more severe pain for several hours. In ulcerated lupus all crusts are removed, and the solution is freely painted on the raw surfaces. This causes considerable pain, but it is well borne by patients if not too large an area is done at one sitting. The surface of the ulcer first becomes yellowish white, but in a few days much serous exudation gives rise to a thick heaping up of crust. At the end of a week, the crusts are picked off, leaving a purulent surface with a pink healthy margin. The number of applications depends upon the extent of the disease and the depth of the inflammatory infiltration accompanying these ulcers. In lupus of the nose, the solution may be carefully painted on the lesions of the mucus

membrane, as well as on all nodules or ulcerations on the skin surface. In extensive cases it can be done at one sitting under a general anesthetic, or it can be carried out gradually covering a little surface at a time without an anesthetic. The results in this form of lupus have been better than with other methods of treatment, but as yet no complete cure can be claimed in extensive cases. The remedy has not been used for a sufficient length of time to effect such a cure, but the good results obtained justify its more general use.—*The Treatment of Lupus Vulgaris by the Liquid Acid Nitrate of Mercury, H. G. Adamson, Brit. M. J., July 24, 1290, 123.*

**Treatment of Enclosed Tuberculosis Lesions by Oxygen.**—This method has been used successfully by Rost in the treatment of tuberculous joints, psoas abscess, and tuberculous peritonitis. In the case of joints, for instance, the joint is drained of fluid by puncture, iodin solution—1 dram to the pint—is run through, and the joint is then inflated with oxygen. Only one treatment has been necessary in these cases. The joint is then apparently normal, and functioning. In cases of tuberculous peritonitis, the peritoneal cavity is filled with oxygen. Psoas abscess sinuses are injected with oxygen twice daily. Full details of the treatment are given.—*Treatment of Tubercular Affections of Enclosed Cavities, Abscesses and Caries, by Inflation with Oxygen, E. R. Rost, Indian M. Gaz., September, 1920, lv, 329.*

**Tuberculin, Its Uses and Abuses.**—The author is an enthusiastic adherent of tuberculin treatment. Just as a slight infection with living tubercle bacilli, if recovered from, confers a certain degree of immunity on the patient, so small doses of tuberculin will do the same thing. Active disease should not be treated with tuberculin. The active symptoms may first be controlled by rest in bed and other appropriate measures. After they have subsided, one ten-millionth of a milligram of tuberculin is given, and the dose progressively doubled at five day intervals, until 1 mgm. is reached. This takes about 30 doses or 150 days. This maximum dose is kept up at fortnightly intervals for a year. In afebrile cases the starting dose is one ten-thousandth of a milligram. If there is no reaction, the dose is progressively doubled as described above. If there is a reaction at any stage, the last dose is repeated, and if the reaction persists, a still smaller dose administered. The author obtained favorable results in tuberculosis of the spine, joints, lungs and in scrofulous children, especially those with phlyctenular conjunctivitis.—*Tuberculin, Its Uses and Abuses, R. H. Cowley, Kentucky M. J., September, 1920, xviii, 30.*

**Tuberculin Treatment.**—Immunization against tuberculosis can be obtained naturally and artificially to a certain extent, and hence vaccination of man is no idle dream. To date it has not been fully realized, but tuberculin treatment reinforces the resisting powers, and usually, in the course of months, slight improvement may be counted on if the forces of the organism are still capable of offering resistance to the infection. The tuberculin is merely an adjuvant. An experience of fifteen years has demonstrated its efficacy in many cases. In tuberculosis every physical trauma no matter how insignificant, augments the virulence of the bacilli and reduces the resistance of the cells in the foci. Repose is indispensable in treatment of the tuberculous. They must avoid all work, all sports, and everything that induces fatigue. Tuberculin must never be given in amounts large enough to induce an appreciable reaction in the focus. It probably always acts on the focus, but this action must never be pronounced enough to be clinically apparent. The diagnostic importance of tuberculin is sustained anew by three cases in which supposedly healthy persons gave a positive conjunctival reaction but, as they never showed any signs of tuberculosis, no attention was paid to the findings of the test, until three years, six and eight years later extremely severe tuberculosis became manifest. It would be absurd to treat for tuberculosis every one giving a positive skin or intracutaneous test, but this should be the rule when tuberculin tests elicit exaggerated positive responses.—*Étude sur l'action thérapeutique de la tuberculine, M. Jacquerod, Rév. Méd. d. l. Suisse Rom., June, 1920, xl, 333.*

**Tebelon in the Treatment of Surgical Tuberculosis.**—Tebelon is a proprietary preparation consisting of the isobutyl esters of fatty acids from the tubercle bacillus. Stoeltzner, who isolated the substance, believes that it stimulates the production of antibodies against the waxes of the tubercle bacillus. The results on 19 cases are reported, including bone, joint, gland and skin lesions. In 10 complete healing occurred within one and a half to three months. Not only were fistulae closed, but by X-ray there was evidence of regeneration about areas of osteosclerosis. Five cases were improved while in 4 the condition remained the same. The usual surgical and ortho-

pedic measures were continued during the Tebelon treatment. Cases showing a positive Pirquet reaction before treatment showed none after its completion. One cubic centimeter of tebelon was injected subcutaneously into the back every third day. No ill effects attended its use. If antibodies are formed which are capable of dissolving the capsule of the bacillus, the absence of fever is difficult to explain.—*Tebelon in der Behandlung der chirugischen Tuberkulose, W. Baensch, Münch. med. Wchnschr., August 27, 1920, lxvii, 1009.*

**Specific Treatment of Tuberculosis at High Elevation.**—Carl Spengler describes the treatment with the so called immune bodies as applied in Davos, Switzerland. During one week before the specific treatment is begun hemoglobin is administered to enhance the formation of red blood cells. Iodine with albumen by mouth or inunctions of iothion are also given. For cough and pain codeine or codeine and morphine are given by mouth, and for insomnia due to the tuberculosis poison, hypnotics such as dial, bromural, and adalin, until the specific treatment has had time to manifest its beneficial effects. The open air cure must be adapted to the individual case. Rest on the steamer chair out of doors is not continued longer than an hour or two morning and afternoon, and in the winter is ordered only on bright, sunny days. By this plan the patients gain much more weight than they do upon the arbitrary open air treatment. Anemic and anorexic patients are not put out of doors at all in the winter season at high altitudes. In cold weather all patients are put in warm beds in their own rooms in the afternoon, with the windows open. Undoubtedly many therapeutic failures at high altitudes are due to excessive open air treatment. The immune bodies or IK are given either hypodermically, by inunction, or by the mouth. One of the chief rules of administration is never to increase the dose where the patient's temperature continues to descend. In contrast to tuberculin therapy, increased dosage is indicated only when the temperature has become stabilized or has begun to rise again. Tuberculin is dangerous except in the hands of specialists, while the immune bodies may be used by any physician without risk in all cases that are not far advanced. Increased dosage is, furthermore, employed only when local reaction from the previous amount has completely disappeared. Inunctions are given at weekly intervals, and by mouth the remedy is given two or three times a week. Excellent analgesic and curative results have been noted from applications of a 0.1 per cent solution of IK to tuberculous ulcerations. Pain and photophobia accompanying eye lesions are also similarly relieved. Iodine, with albumen, is particularly indicated in scrofulosis and torpid tuberculosis. In children one or two drops and in adults five or six drops of freshly prepared tincture of iodine, diluted in a cupful of milk, are given at breakfast for two weeks, to be followed by an equal period of rest, and so on. Such medication should be applied *en masse* in schools and among children showing signs of tuberculous heredity or incipient tuberculosis. Iothion inunctions—0.5 to one gram a day—are administered, like mercury, on different surfaces of the body, in fortnightly courses followed by rest for an equal period. By this plan of treatment permanent recoveries are obtained in ninety to one hundred and fifty days in many cases of tuberculosis not yet too far advanced. Artificial pneumothorax and extrapleural thoracoplasty are indicated only in cases in which specific immunizing therapy has failed, and can only prove successful when there is collapse of the lung, and autoimmunization due to the lung collapse. Specific therapy and iodine with albumen should always precede such measures in order to improve the condition of the lung tissues and increase their ability to undergo atelectasis.—*Le traitement spécifique de la tuberculose à l'altitude, C. Spengler, Presse Méd., April 24, 1920, No. 25, 2441.*

**Treatment with Partial Antigens (Deycke-Much).**—The treatment was tried on 156 cases which had previously been under observation for several weeks. One hundred and forty-six were uncomplicated pulmonary cases; 10 showed bone and gland lesions only. The former were classified clinically as cirrhotic-nodular, nodular, or nodular-pneumonic types. Eight days before commencing treatment all patients were given intracutaneous tests with the several antigens, M Tb R, A, F, and N. These were repeated two or three weeks before the end of the treatment. Twenty-five patients were treated with the partial antigens, A, F, and N only; while the remainder received M Tb R only. In a first small group of 10 the initial dose was determined by the reaction to the intracutaneous test. The second group was likewise started in this manner, but later the highest dilution (0.1 cc. = 1: 100,000 mil.) was employed. The average duration of treatment was five or six months. Most of the cases were kept at rest and all were given the usual dietetic and fresh air treatment. The authors conclude that the treatment is only beneficial as

an adjunct to the usual dietetic and hygienic measures in incipient cases; and that even in these it is in no way superior to the ordinary tuberculins. They add that no ill effects have been observed. For diagnostic purposes little insight is gained as to the action of the defensive mechanisms of the body. *Erfahrungen über die Partialantigene (Deycke-Much), L. Jacob and M. Blechschmidt, Münch. med. Wchnschr., April 1, 1920, lxvii, 447.*

**An Attenuated Tubercle Vaccine.**—Raw thinks that human and bovine tuberculosis are separate and distinct diseases, but that the human body is susceptible to both, especially to bovine tuberculosis in the early periods of life. The two diseases are so rarely seen in the same subject that there are strong grounds for presuming that they are antagonistic to each other and that bovine tuberculosis may confer an immunity against human tuberculosis and vice versa. Possessed of this idea Raw has secured nonvirulent cultures of both human and bovine bacilli. From these he prepares separate tuberculins. Cases of glandular tuberculosis, and all tuberculosis in children, which is evidently of bovine origin, he treats with the tuberculin made from the human type, while, on the other hand, cases of pulmonary tuberculosis are due to the human type. He says that tuberculin should always be prepared from attenuated and nonvirulent cultures; that it should be freshly prepared and used within a week; that it should be given in graduated and increasing doses at intervals of seven days; that acute reactions are not necessary; that not less than twelve injections should be given at intervals of one week; and that the most favorable cases for treatment are local lesions, but early cases of pulmonary tuberculosis may be limited and a further spread to other parts of the lungs prevented. —*Editorial, J. Lab. & Clin. Med., September, 1920, v, 813.*

**Surgical Tuberculosis Treated by the Friedmann Method.**—Fifty-two cases were treated by this method during 1914. The ages ranged from one and a half to sixty-nine years, 30 of the patients being under ten years old. The lesions were in the bones, joints, glands, skin and genitourinary tract. In 14 the Friedmann vaccine was exclusively employed; in the rest it was combined with surgical procedures. Injections were made into the gluteal muscles, sometimes repeated once a week or more. A year later, 7 of these cases were completely healed, 30 showed temporary improvement, 13 were unimproved, and one had died. Five or six years later, 47 were again followed up. Nine had died, 6 of tuberculosis; and of these, 3 died within a month after their discharge. Two died from causes other than tuberculosis. Six patients, although improved, failed to show complete healing. Thirty-two showed no trace of tuberculosis. The complete history of one patient with a tuberculous peritonsillar abscess, who recovered under the treatment, is given. A case of coxitis was treated, relapsed after three months was again treated and showed marked improvement and entire freedom from pain. A case with genitourinary tuberculosis is under observation in which the improvement was interfered with by a smallpox vaccination.—*Die Behandlung chirurgischer Tuberkulosen mit dem Friedmannschen Mittel und ihre Ergebnisse nach 6 Jahren, F. Krumm, Münch. med. Wchnschr., July 23, 1920, lxvii, 870.*

**Treatment of Surgical Tuberculosis with Cold Blooded Tubercle Bacilli.**—Patients are given subcutaneous or intramuscular injections of living turtle tubercle bacilli. Fistulae are treated by direct application into the tract. The dose is from 0.25 to 0.3 cc. of a homogeneous suspension of the organisms. The concentration of the suspension is not of great moment, as the bacilli are avirulent and nontoxic. The intramuscular injections are made into the gluteal or deltoid muscles. If the hard nodules arising at the site of injections become softened, raying with direct sunlight or roentgen ray (with a 2 mm. aluminum filter) soon restores them to their previous hard condition. With three exceptions, all cases so far treated have been ambulant. No ill effects have been noted with the occasional exception of a slight temporary rise in temperature. The result, especially in children, is a prompt "fixation of toxin" manifested by a disappearance of nightsweats, an increase in appetite and in weight and prompt improvement of the general appearance. It is alleged that the cold blooded tubercle bacillus vaccine is a specific for tuberculosis and scrofulosis. The prognosis is better the earlier treatment is commenced.—*Über, die Behandlung der chirurgischen Tuberkulose mit Kaltblüter Vakzine, Brandenstein, Münch. med. Wchnschr., July 2, 1920, lxvii, 786.*

**Extrapleural Thoracoplasty.**—By improving his technique the author has reduced his operation mortality from 30 to 4 per cent. Of 33 patients surviving the operation 15 obtained a curative result. The following summarizes his experience:

In unilateral or mainly unilateral pulmonary tuberculosis, which is not cured by rational treatment (including pneumothorax), good results can be achieved by the operation. Extrapleural thoracoplasty should be performed only after conference with the physician treating the patient, who must have had an opportunity, by observation during a considerable period, of forming a thorough opinion of the prognosis in the case concerned. Resection of the ribs should be carried out under local anesthesia through a paravertebral incision, so that the posterior part of the ribs from the eleventh, or, in any case from the tenth to the first inclusive, can be removed. If a cavity remains, it can be brought to collapse by means of intrathoracic transplantation of fat. It is necessary that practising physicians should acquire knowledge of the indications and results of extrapleural thoracoplasty. One has now no right to withhold the chance of operation from suitable patients.—*Extrapleural Thoracoplasty in the Treatment of Pulmonary Tuberculosis, With an Account of 37 Cases, P. Bull, Lancet, October 16, 1920, cxclx, 778.*

**The Albee Operation for Tuberculosis of the Spine.**—Over 100 cases have been treated, but this report deals with only 60, operated upon from September, 1913, to August, 1918. All cases of unhealed tuberculosis of the spine were subjected to this treatment, the only contraindications being the contamination of the operative field by fistulae or wounds, and the occurrence of paralyses or poor general condition of the patient. The ages of the patients varied from one to forty-eight years, 44 being ten years and under. A questionnaire was sent out at the end of 1919 to all operated patients. Only 57 could be considered, as 2 had died within a year after the operation and in 1 the graft had not taken. All but 8 of these were traced. Of the 49 remaining, 42 showed apparent, and 26 permanent, healing. Such bone implantation is a procedure without serious technical difficulties and offers the patient early and permanent recovery. If deformity has not already been established it is prevented; if kyphosis exists its further development is checked.—*Über unsere Erfolge mit der Albees'chen Operation in 60 Fällen von Wirbelsäulentuberkulose, Görres, Münch. med. Wchnschr., July 30. 1920, lxvii, 896.*

**Treatment of Tuberculosis of Spine.**—The total number of cases reviewed by Stone is sixty-five. Thirty-three patients were operated on in one way or another while the remaining thirty-two received what is termed conservative treatment. On the basis of his findings Stone does not recommend ankylosing operations for tuberculous spine in children. About 19 per cent of cases of Pott's disease treated in the usual way developed abscesses. Fourteen, or over 42 per cent, of thirty-three operative cases, had abscesses. Operation has not prevented increase in deformity, and after-care must be carried out during as long a time following operation as if nothing had been done. The mortality of operative cases was 15 per cent.—*Operative and Non-Operative Treatment of Tuberculosis of Spine, C. A. Stone, Missouri State M. Ass., September, 1920, xvii, 367.*

**Temporary Disarticulation of the Foot for Tuberculosis.**—Revel gives an illustrated description of three cases in which severe and extensive tuberculous processes in the foot, one of thirty years' standing, were cured by excision of all the morbid tissues. Access is obtained by Delbet's method of opening up the foot across, at the mediotarsal articulation or between the tarsus and the metatarsus, cutting the tendons, vessels and nerves of the dorsum of the foot. The joint thus opened up, the fore part of the foot is swung down and the region is thus exposed like an opened book. Supplementary lengthwise incisions afford still more complete access, and the diseased soft parts and bones can be scraped and cleaned as perfectly as in preapring an anatomic specimen. The fore part of the foot is then sutured back in place and heals by primary intention. The foot is shortened by the total of bones that have had to be resected, but it answers the purpose of a foot, and the tuberculous lesion is a thing of the past. In one of the cases described, the lesion was of two years' standing, and he had to resect the scaphoid, cuboid, third cuneiform and part of five metatarsal bones; in another, the entire anterior tarsus and part of four metatarsal bones. In the third the astragalus had to be removed.—*De la désarticulation temporaire du pied pour tuberculose, J. Revel, Rev. d. Chirurg., 1920, xxxix, No. 3, 205.*

**Preparation of Tuberculins for Diagnosis in Animals.**—Uniform methods for the preparation of tuberculin must be instituted. During the past two years observations were made to determine the influence of certain changes of technic upon the potency of the product with the following results: Beef bouillon tuberculin is as potent as that prepared from veal. The growth on 3 per cent glycerin broth is not as good as that on 5 or 7 per cent broth.

Acid potassium or acid sodium phosphate may be substituted for sodium chloride in the culture medium. Tubercle bacilli of bovine or human type are equally suitable for producing tuberculin. Four weeks' old cultures are usually impotent. There is little difference between cultures older than eight weeks and up to twelve weeks. Tuberculin heated at 100°C. for three hours in the Arnold steam sterilizer is more potent than when unheated and autoclaved. Tuberculin kept in diluted form was found as potent after five or six years as the concentrated form. Berkefeld filtering does not alter the potency and should be practised. With carbolic acid as preservative the percentage seems to play no important part up to 1.5 per cent. Twelve affected guinea pigs should be used to compare the potency: 3 receive 4 c.c.; 3, 3 c.c.; 3, 2 c.c.; and 3, 1 c.c. per 500 gm. body weight.—*The Preparation of Tuberculins for the Diagnosis of Tuberculosis in Animals, F. Boerner and M. F. Barnes, J. Am. Vet. M. Ass., November, 1920, lviii, 165.*

**Combination Tuberculin Tests on Cattle.**—It was observed in the work of the Pennsylvania Bureau of Animal Industry in 1913, when the subcutaneous and intracutaneous tests were applied simultaneously, that the subcutaneous test had a modifying effect on the intracutaneous reaction. This has been confirmed subsequently by Turner's work. The intracutaneous test when applied three days prior to the subcutaneous interferes with the subcutaneous reaction. When the subcutaneous test is applied a few days prior to the intracutaneous, it has a marked influence on the latter, but the interference is not as decided as when the intracutaneous precedes the subcutaneous test. The conjunctival test can be applied in any combination without being interfered with, or influencing the other tests. In animals which have reacted to the conjunctival test a return of the conjunctival reaction when later retested by the subcutaneous method has been observed. In one herd this occurred after a period of seventy-eight days. Of the 18 animals which had reacted to the previous conjunctival test, 13 showed a return of the local reaction. From the results here shown, as well as from the observations of others, it is evident that a uniform plan for applying the combination tests is needed.—*Combination Tuberculin Tests, H. W. Turner, J. Am. Vet. M. Ass., November, 1920, lviii, 165.*

**Superiority of Combination Tuberculin Tests on Cattle.**—The records of the Federal Bureau of Animal Industry indicate that during the fiscal years 1918, 1919 and 1920 approximately 1,100,000 head of cattle were tuberculin tested under the coöperative plan. The combination test starting with the intracutaneous injection and the sensitizing ophthalmic disk, followed in seventy-two hours by subcutaneous injection and diagnostic ophthalmic disk, should be carried out in badly infected herds. Experimental work showed the ophthalmic method somewhat superior to the other recognized methods. The advantage of the combination test was fully demonstrated. Two reactors and one suspect were found, as results by the subcutaneous method, and two reactors and one suspect by the intracutaneous method. No case of generalized tuberculosis was missed as a result of the combination tests. Special arrangements should be made to have reactors autopsied by men especially qualified. In summarizing the results obtained from combination tests, the following points stand out: (1) Each method of testing has its value. (2) The use of all methods should be encouraged. (3) The combination of methods, having proved its superiority, should be used on all badly infected herds or on any animal of doubtful health, and in retesting suspicious animals. (4) There should be fewer animals classified as suspicious as a result of combination tests. (5) The most careful postmortem work is essential.—*The Superiority of Combination Tuberculin Tests Over Any Other Method, L. H. Ernest, J. Am. Vet. M. Ass., November, 1920, lviii, 174.*

**Eradicating Bovine Tuberculosis in Pennsylvania.**—The following conclusions were reached, based on the results of testing 964 herds under the accredited plan and 12 herds owned by public institutions: (1) A definite plan for suppressing, controlling or eradicating tuberculosis is indispensable. While the officially accredited herd plan, as now drawn, can be improved upon in some respects, yet it is recognized as the best plan so far advanced for dealing with the proposition on a nation-wide basis. (2) A definite method of applying the different tests has worked well in Pennsylvania. (3) After seven years' trial it has been proved that in order to free infected herds from tuberculosis the combination tests must be used. (4) As the disease decreases the inefficiency in no-lesion cases increases, that is, cattle are condemned which on autopsy show no visible lesion of tuberculosis. This may be due to conditions producing pus, to parasitic diseases, actinomycosis, atmospheric changes, pregnancy, inexperienced testers, and idiosyncrasy to tuberculin. (5) No-lesion cases must be reduced by 50 per cent by a complete history taking of the

herd before classifying animals as tuberculous. An excellent method in animals, which cannot be properly classified, is to slaughter first those which give the strongest reaction and are supposedly tuberculous, and to continue slaughter of animals as long as the disease can be demonstrated. (6) Tests must be conducted in the most careful manner and treated as a delicate major operation.—*Eradicating Tuberculosis in Pennsylvania, S. E. Bruner, J. Am. Vet. M. Ass., November, 1920, lviii, 147.*

**Disposition of Tuberculous Cattle.**—No practical or scientific method is in use at the present time for disposing of tuberculous cattle. Concentration farms should be instituted to which all reactors should be shipped. Valuable purebreds should be conspicuously marked and their history sent to the farm manager. Valuable females should be sent to a second farm where they would receive better care. Calves are to be sent to a third farm where no tuberculous cattle are harbored and are to stay there until tested and passed by two tuberculin tests. From May, 1918, to July, 1919, an abandoned farm was rented and equipped like any regulation farm. The milk obtained was used for the preparation of condensed milk, which process sterilizes the milk. This and the sale of veal calves helped to reduce expenses so that the average cost of each reactor handled through this farm was 19 cents. This project ought to be undertaken as a permanent State project.—*Disposition of Tuberculous Cattle, O. H. Eliason, J. Am. Vet. M. Ass., November, 1920, lviii, 155.*

**Chemical Disinfection of Tuberculous Sputum.**—A solution already used with success by Küss for several years is highly recommended for this purpose. It consists of soft, potash soap, 8 grams; crystalline sodium carbonate, 10 grams; 35 per cent formaldehyde solution, 40 c.c., and water, enough to make 1 liter. This soapy, alkaline solution, containing 4 per cent of formaldehyde, liquefies the sputum thoroughly and certainly kills the tubercle bacilli in from fifteen to twenty hours. The solution is, moreover, odorless, gives off no irritating fumes, is of low toxicity, is easily handled, facilitates cleansing of sputum cups by its liquefying property, and can be prepared by any one at slight expense. The practitioner is urged to use this solution whenever circumstances do not permit of disinfection of sputum either by boiling water, steam, or incineration.—*Comment désinfecter les crachats des tuberculeux, E. Arnould, Presse Méd., April 3, 1920, No. 19, 333.*

**Public Health Service Warns Consumptives.**—The migration of army patients suffering with tuberculosis to the semi-arid West is causing the United States Public Health Service no little concern, for all the Service hospitals and all the contract hospitals in that region are now completely filled. It is considered to be very unfortunate that the patients should leave places where the government is ready and able to care for them and go to other sections where it is absolutely impossible for it to provide proper care and where even ordinary housing accomodations are largely unobtainable. The Service is making and will continue to make strenuous efforts to meet the needs of the patients, but the great amount of travel to that part of the country makes the problem very serious.—*Health News, United States Public Health Service, December, 1920.*

**Dust Hazard in an Ax Factory.**—The average tuberculosis death rate for the period 1900–1918 inclusive for male persons in Connecticut is 1.7 per 1000. For the employees other than polishers and grinders in the big ax factory at Collinsville it is 1.6, and for the polishers and grinders it is 10 times higher. These workers are ruled out of all the life insurance companies, since the constant inhalation of the grit and bits of steel thrown off in the process induces "grinders' consumption." Americans would not work in these rooms. French Canadians used to do it for a few years and then go home to linger a while and die. Swedes took up the work and would get the disease in nine or ten years. Now Finns and Poles are at it and last only three to five years. The enormous tuberculosis incidence is due to the hazards of wet grinding on sandstone wheels. The substitution of dry grinding with an efficient exhaust system (or possibly the use of wet grinding on artificial abrasive wheels of a harder nature) is clearly indicated as a measure for the protection of the workers against respiratory disease.—*A Study of the Dust Hazards in the Wet and Dry Grinding Shops of an Ax Factory, C.-E. A. Winslow and Leonard Greenburg, U. S. Public Health Rep., October 8, 1920, xxxv, 2393.*

**Deaths and Death Rates from Pulmonary Tuberculosis in New York City and State.**—The following table, showing the death and death rates from pulmonary tuberculosis for New York City and State, for September during the years 1913 to 1920, inclusive, is taken from the *Monthly Vital Statistics Review, New York State Department of Health, November, 1920, New Series, vol. 1, no. 9.*

*Pulmonary tuberculosis: Deaths and death rates,* New York State and large subdivisions, September, 1913 to 1920*

| MONTH | YEAR | NEW YORK STATE | | NEW YORK CITY | | REST OF STATE | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Total | | Urban | | Rural | | Institutional districts | |
| | | Number | Rate | Number | Rate | Number | Rate | Number | Rate | Number | Rate | Number | Rate |
| September average | 1913–17 | 1,036 | 124.6 | 646 | 143.7 | 390 | 102.3 | 187 | 101.1 | 203 | 103.4 | | |
| September | 1913 | 961 | 120.2 | 577 | 135.0 | 384 | 103.2 | 179 | 98.9 | 205 | 107.9 | | |
| September | 1914 | 1,109 | 136.0 | 693 | 158.5 | 416 | 110.7 | 206 | 111.4 | 210 | 110.3 | | |
| September | 1915 | 992 | 119.3 | 647 | 144.0 | 345 | 90.5 | 164 | 88.6 | 181 | 92.2 | | |
| September | 1916 | 984 | 116.5 | 602 | 131.1 | 382 | 99.2 | 196 | 104.6 | 186 | 94.2 | | |
| September | 1917 | 1,136 | 131.8 | 711 | 151.2 | 425 | 109.1 | 193 | 101.2 | 232 | 116.0 | | |
| September | 1918 | 932 | 106.4 | 554 | 115.1 | 378 | 95.9 | 164 | 84.5 | 176 | 87.5 | 38 | |
| September | 1919 | 822 | 92.0 | 478 | 97.1 | 344 | 86.2 | 139 | 70.3 | 172 | 85.1 | 33 | |
| September | 1920 | 741 | 81.7 | 418 | 83.1 | 323 | 80.1 | 124 | 62.0 | 163 | 80.1 | 36 | |

* Deaths per 100,000 population per annum.

**Annual Report of the Health Officer of Newcastle-upon-Tyne for 1919.**—The tuberculosis medical officer reports 10,332 consultations as against 11,517 in 1918 and 9286 in 1917, at the dispensary. There were 724 new cases, 76 less than in 1918, and 455 deaths, the lowest mortality yet reached. Twenty per cent of the cases were first discovered by the tuberculosis officer among the home contacts of the known patients. Remedy of the housing shortage and an active aftercare organization are necessary for the full effect of the preventive work. Many cases still come for treatment too late for any hope of cure. Of 853 patients treated in Corporation beds at Barrasford since 1908, at the end of 1919 there were 31 still in the institution, 233 well, working or fit to work, 101 improved or moderately well, 38 relapsed, 329 dead, and 121 lost sight of. One hundred and seventy-three advanced cases were discharged from the sanatorium pavilions, Walker Gate, and 14 of these were fit to work, 67 were improved, 44 unimproved, and 48 died in the hospital. The great value of the sanatorium pavilions lies in the prevention of the infection of other members of a household where the home conditions are not such as to permit of sufficient precautions being taken, and to some extent in the patching up of patients sufficiently to allow a proportion of them to return to work for a further period. Four hundred and ninety-six deaths were registered as due to tuberculosis; of these 346 were due to pulmonary tuberculosis and 150 to other forms. The death rate per 1000 population due to tuberculosis was 1.8. Of the 496 who died, 249 were known to the dispensary staff. The average duration of illness was 37.6 months in males and 27.3 months in females. The average period between notification and death was 14.3 months. This is greater than in previous years. The death incidence was highest among laborers in males, house workers in females. In 33.45 per cent there was a history of active tuberculosis in a near relation. Among the new developments at the dispensaries are additional consultation sections, improvements in the records of the patients, research into the relationship between influenza and tuberculosis, X-ray, closer relationship with general practitioners, who sent in 50 per cent of the dispensary cases. Half of the visits at the dispensaries were made by children.—*Annual Report of the Medical Officer of Health of the City and County of Newcastle-Upon-Tyne, During the Year 1919, W. H. Dickinson, Tuberculosis Medical Officer.*

**Tuberculosis in Primitive Tribes.**—A study of the geographic distribution of tuberculosis shows that there are still many large tracts of the earth's surface where this disease is rare or absent. Members of isolated communities, where tuberculous disease is rare or absent, show, in comparison with members of infected communities, a marked susceptibility to the disease. The relatively high resistance to tuberculous infection manifested by the majority of individuals in infected communities is attributable to acquired immunity resulting from previous contact with the disease. The susceptibility of African and other primitive races to tuberculosis is the susceptibility of virgin soil. A theory of infection and resistance in mutual interaction is capable of explaining these statistical correlations that have been adduced to support the theory of inherited disposition. All the phenomena of variation in clinical type, comparative mortality, distribution, according to age, sex, locality, and occupation, noted as characteristic of tuberculosis in a highly organized community, are explicable in terms of infection and resistance. Recent statistical investigations support the assumption that mild infections with bovine bacilli may play an important part in raising the general resistance to the human type of tuberculous disease. One of the results of this increased resistance may be the production of greater chronicity of phthisis pulmonalis, a lengthening of the life of bacillus carriers and excreters in the parental period, and a consequent increase of danger to infants and children. These considerations indicate that exhaustive research is still necessary in order that efforts at the control of tuberculosis may be directed along effective lines.—*Tuberculosis in Primitive Tribes and Its Bearing on Tuberculosis of Civilized Communities, S. L. Cummins, Internat. J. Publ. Health, September, 1920, i, 137.*

**The Hereditary Factor in Tuberculosis.**—There still appears to be a good deal of misunderstanding as to what the hereditary factor in tuberculosis really means. It is supposed that certain constitutions are more and certain other constitutions less resistant to pulmonary tuberculosis. It is immaterial whether the tuberculous diathesis be looked upon as an inheritance of susceptibility or an inheritance of resistance, for both are but grades in the scale of immunity peculiar to the individual. In a community where tuberculosis has been prevalent for many centuries, it is anticipated that natural selection would steadily intensify the immunity by eliminating those with less resistance. The higher grades of resistance survive and are transmitted by heredity. In a community wherein the tubercle bacillus has not been introduced there will have been no selection to raise the average degree of

immunity. There will, however, be many grades of susceptibility, and these will be inherited, whether or not they have been put to the test of an infected environment. The theory of an inherited resistance is not affected in any way by the well-known fact that isolated groups of mankind have little resistance to tuberculosis. It is rather what we should expect on the theory of evolution by natural selection with the transmission of hereditary characters.—*The Hereditary Factor in Tuberculosis, K. Pearson, Lancet, October 30, 1920, cxcix, 891.*

**The War and Tuberculosis Among the Children of Munich.**—Analysis of the histories of 1940 patients at the University Pediatrics Clinic from 1912 to 1919 inclusive showed that the incidence of positive Pirquet reactions occurred earlier in life during the years of the war than in those which preceded. The tuberculosis death rate among children throughout the whole city of Munich increased during the year 1916, while the rate for adults did not. This increase was confined chiefly to the ages from one to five. In 1917 the figure sank below that of 1914 and continued to fall during 1918 and 1919, although more slowly than in peace years. A possible explanation of the sudden increase is suggested in the fact that the previous two years of the war had brought to light many open cases of tuberculosis in adults. While all the ablebodied were engaged in military service the care of children was often left to the sick. In the later years of the war these conditions were remedied, children were brought into the country and their diet was carefully provided for even at a sacrifice on the mothers' part. The children of Munich were more fortunate than those of other German cities but it is to be feared that when these children, infected so early in life, reach school age severe forms of tuberculous disease may occur.—*Über die Einwirkung der Kriegsverhältnisse auf die Tuberkulosehäufigkeit unter den Münchener Kindern, J. Bartschmid, Münch. med. Wchnschr., August 13, 1920, lxvii, 957.*

**X-Ray Studies of Bronchial Function.**—Fluoroscopic observations and studies of the radiograms, following the accidental injection of an opaque substance into the tracheobronchial tree in a patient with a malignant tracheo-oesophageal fistula, seemed to disclose peristaltic action in the bronchi. This led to an experimentation on animals. Thorium, iodoform and bismuth injected into the bronchial tree of dogs caused their death. Barium in olive oil or petrolatum paste has given a safe means of studying bronchial function, radiographically. The following observations were made: (1) Injection of the left diaphragmatic bronchus and its branches shows lateral motion of the bronchus with each pulsation of the heart. (2) Synchronous with respiration, there is a bellows-like expansion and contraction of the trachea and bronchi, which is very obvious in the relaxed bronchus immediately after injection. This expansion and compression of the bronchi are probably produced by costal breathing. (3) A third movement of larger cycle was observed. This is a movement of long peristaltic wave (10 cm.) though of small amplitude. It seems to be a potent factor in the evacuation of the barium. It is too rapid for ciliary action. (4) Adrenalin injected into dogs, after filling the bronchi with barium, caused contraction of the bronchi. Benzyl-benzoate caused dilatation. 1 mgm. of muscarin, intravenously, induced bronchial spasm, which was relieved by adrenalin intravenously.—*Roentgen-ray Studies of Bronchial Function, J. G. M. Bullowa and Chas. Gottlieb, Am. J. M. Sci., July, 1920, clx, 98.*

**Bacillary Dissemination.**—From the bodies of persons who had had pulmonary tuberculosis in an apparently mild form but had died of other diseases, pieces of tissue were taken from various organs as kidneys, liver, spleen, suprarenals, and the clots of thrombosed veins and were inoculated into the peritoneum of guinea pigs. The results were positive in 57 out of 73 tests, confirming the frequent impregnation of remote organs with tubercle bacilli. This so called bacillary diathesis is latent or presents only trifling symptoms. The lesions are the consequence of repeated mild infections of organs in the condition of relative immunity, but oversensitive and consequently incapable of resisting a massive infection. The sudden deaths without an acute terminal syndrome in certain cases of pulmonary tuberculosis are examples of humoral allergy induced by this bacillary dissemination.—*La diathèse bacillaire et les bacilloses histologiques, M. E. Lenoble, Bull. d. l'Acad. d. Méd., July 27, 1920, lxxxiv, 65.*

**Pathological Biology of Tuberculosis.**—Human and bovine tuberculosis are subspecies of one and the same species. The difference in properties is probably due to adaptation to their hosts. The virulence of human bacilli can be increased so that they behave like bovine bacilli, and highly virulent bovine bacilli can be so attenuated that they possess only the qualities of human bacilli. The tuberculin and the partial antigens of human and bovine bacilli

are identical. There may be tuberculous infection without anatomic changes. Wolff found the granular form (Much's granules) in a perfectly normal gland of a child. Vaccination of animals with these glands produced tuberculosis. The most delicate tuberculin reaction is the intracutaneous. Intrauterine tuberculous infection, though rare, undoubtedly occurs. Tuberculous infection usually dates back to the first years of life. The majority of human beings become infected at that time. The result may be either progressive tuberculosis or complete cure. The overcoming of the infection produces natural active immunity. Cattle may be immunized against bovine tuberculosis with living human bacilli. Tuberculous animals are protected against reinfection. In countries where there is little immunity to tuberculosis, infection overpowers the individuals rapidly and the lesions produced differ from those seen in the immunized, as for instance in some of the little frequented localities in Turkey, the Argentine, Africa and Palestine. The immunity developed during childhood must be constantly kept up and strengthened during later life. Testing of the immunity of healthy persons with partial antigens at various periods reveals the following results: Cell immunity, tested by the intracutaneous test, remains relatively unchanged. Blood immunity, tested by complement fixation, changes very rapidly. Laboratory workers showed rapid increase in partial antibodies when working in the tuberculosis division. Increase in blood immunity gradually strengthens the cell immunity. Blood antibodies, supplied by the cells, rapidly destroy germs. The immune bodies in the tuberculous are in no way different from those in the nontuberculous immunized individual. They are directed unconditionally against reinfection, and conditionally against the organisms already in the body. This behavior is responsible for the chronic course of the disease. Rapidly progressing, that is, miliary, tuberculosis appears where there are no antibodies. Lack of antibodies may be due to nonformation, as in the child or the adult in noninfected countries, or to their disappearance, when they have never been present in sufficient quantities. This may be due to congenital weakness, or weakening influences in early life, such as insufficient food or disease. Breakdown of immunity may be caused by intercurrent diseases. Measles, whooping cough, influenza may attenuate or temporarily remove the tuberculosis antibodies. Other causes of breakdown are local disease of the lung, including the old focus, malnutrition, adolescence, pregnancy, hazardous occupations, overexertion of mind and body. The role of trauma is questionable, Probably its effect is due to the lowering of the general resistance. The local infections which butchers and laboratory workers contract while working with tuberculous material (human and bovine) remain localized, because of a previous immunization. Why cannot the unimmunized adult immunize himself as well as the child? The adult is more exposed to the reception of tubercle bacilli in massive doses on the one hand and on the other is not capable of forming antibodies as promptly as the child. A tuberculous individual can be cured only by improving his immunity. Serum can be an immune serum only when it contains all partial antibodies, and even then is only partially efficient, because it only improved the blood immunity. It should therefore be used in conjunction with a vaccine, because the latter confers cell immunity. The oldest vaccine is tuberculin. Commercial tuberculin is a mixture of the water soluble partigen L (Reintuberkulin) and the three water insoluble partigens R albumen, fatty-acid-lipoid and neutral fat (Tuberkulin-Rückstand). Old tuberculin contains also glycerine boullion. The reaction with L is harmful, due to toxin oversensitiveness; the reaction to the three residue partigens is beneficial, due to immune body oversensitiveness. The former must be removed by the administration of increasing doses of pure tuberculin, best in ointment form; the latter must be raised. Curative results are achieved with commercial tuberculin, because it supplies some of the partigens in usable form and helps to remove oversensitiveness. The variations in results are explained by the fact that lacking antigens are in nonusable form, and that anaphylaxis is not removed. Harmful results are caused by antigens, the corresponding antibodies of which have already been formed in the body. This leads to hypersensitiveness and absorption of antibodies. Before treatment is started, we ascertain the extent of the immunity by intracutaneous injection of the partial antigens; then we raise the immune body hypersensitiveness by vaccination with the three residue partigens. If this is not successful, treatment with partigen L is instituted until the anaphylaxis has been removed. The R partigens are then resumed. All forms of tuberculosis are suitable for this treatment, except where there is a complete lack of immune bodies, as in miliary tuberculosis. The results in the renal and peritoneal form have been splendid. To ascertain the efficacy of nonspecific measures such as sunlight, high altitude, sea climate, roentegn rays, hygiene

and diet, chemotherapy, orthopedics, surgery, pneumothorax, partigen tests are made before and after. Partigen testing affords exact biologic control over the specific and nonspecific tuberculosis treatment. It is difficult to gauge the value of protective immunization because of the chronicity of the disease. In spite of the statistical difficulties arising therefrom the problem should be constantly kept in mind.—*Pathologische Biologie (Immunitätswissenschaft), Hans Much, 3. Auflage, Verlag von Kurt Kabitzsch, Leipzig, 1920, pages 289–320.*

**The Endothelial Cell in Experimental Tuberculosis.**—The epithelioid cell is of definitely endothelial origin. The only reliable means of identifying and tracing this cell is, at the present time, a colloidal suspension of carbon, injected intravenously. Benzidine dyes will not accomplish this if used alone. There is little evidence that the local tissue elements take an active part in the process of tubercle formation until after the lesion is formed; the reaction is, in a sense, exudative, since the lesion is produced from cells which migrate to the site of inflammation. The lymphocyte appears late and is not to be considered as a potential epithelioid cell; its presence in the tubercles is as yet unexplained.—*Studies on Endothelial Reactions II. The Endothelial Cell in Experimental Tuberculosis, N. C. Foot, J. Exper. Med., November, 1920, xxxii, 513.*

**The Endothelium in Experimental Pulmonary Tuberculosis.**—The injection of a colloidal suspension, or solution, of carbon into the veins of a living animal, as recommended by McJunkin, furnishes an apparently reliable means of tracing the so called epitheloid cell of the pulmonary tubercle from its origin in the vascular endothelium to the lesion. Experimental tubercles are formed in the lung, as in the liver, primarily by cells originating in the capillary endothelium. These cells are probably present in small numbers in the normal lung lying free both in the alveolar wall and the air vesicles. In response to infection they proliferate in the capillary walls in the vicinity of the invading organisms, migrate in steadily increasing numbers, and, arriving at the site of the infection, further multiply and to some extent fuse to form the syncytia known as giant cells. The epithelial cell takes no active part in the process; its proliferation tends to repair denuded surfaces and is regenerative rather than combative or phagocytic in nature. This cell is free from carbon and stains only diffusely with carmine, in contradistinction to the endothelial cell which readily takes up both pigments in granular form. The cells of endothelial origin not only phagocytose tubercle bacilli, but carry them into the tissues, for example into lymph nodes, by way of the lymphatics, or into other lung lobules by way of the air passages, in which they are readily demonstrable.—*Studies on Endothelial Reactions. III. The Endothelium in Experimental Pulmonary Tuberculosis, N. C. Foot, J. Exper. Med., November, 1920, xxxii, 533.*

**Weight Curves of Tuberculous Guinea Pigs.**—The weight curves obtained by weighing weekly 9 normal guinea pigs were compared with those of 37 tuberculous untreated guinea pigs, and 56 animals which were divided into groups, each for different mode of treatment with various chemicals. The following conclusions were drawn: Normal guinea pigs of approximately the same age and weight and living under the same conditions run a uniform weight curve. This curve is easily modified by changes in diet, by acute infections and other variations in the conditions of life. Normal male guinea pigs of approximately the same age and weight, inoculated with the same dose of the same strain of tubercle bacilli and living under the same conditions, run a fairly uniform and typical weight curve. This weight curve may therefore be used in testing the effect of various methods of treatment and is a more reliable standard than the duration of life. Most chemotherapy, so far as tested, even though the drugs and doses used are so nontoxic as not to interfere materially with the duration of life or with the weight curves of normal, uninfected guinea pigs, tends to alter materially the type of weight curve of infected animals. This alteration consists in the main in a diminution in height of the ascending curve and an increase in length of the descending curve. It may be inferred that the more closely the weight curves of tuberculous animals treated by any method adhere to the normal weight curve, the more benefit we may hope for from the treatment.—*Weight Curves of Tuberculous Guinea Pigs. Studies on the Biochemistry and Chemotherapy of Tuberculosis; XX, Lydia M. DeWitt, J. Infect. Dis., November, 1920, xxvii, 503.*

**Increased Arterial Tension in Tuberculosis.**—Too low a blood pressure is the rule in pulmonary tuberculosis especially during active extensions of the processes, and often one of the first signs of recovery is the rise of blood pressure. There are, however, cases of tuberculous hypertension without any known cause, such as diabetes, obesity, superalimentation, cardiovascular

or renal disorders, syphilis, drugs, etc. These cases are not very common, the author having seen only 15 out of 300 and he is inclined to attribute the hypertension to the interference with the functions of the organs regulating blood pressure by the toxins from some sort of microörganisms. In these cases, the variations in blood pressure are very often exaggerated although the force of the heart is well marked and there is tachycardia increased by effort. The general condition is good; a very constant symptom is the tendency to hemoptysis, very often especially marked in spring and fall, analogous to the congestive hemoptysis of Dumarest. The clinical course of the disease in these cases is very quiet; there is no fever except when there is hemoptysis. The prognosis is favorable and the reduction of the hypertension is a good sign of recovery. In the treatment of these patients, it is best not to use tuberculin, nor creosote, nor guaiacol, nor calcium. The essential treatment consists in the use of the hypotensive medications, trinitrine, emetine, etc. These tuberculous cases of hypertension should avoid eating too much meat. They should not have coffee or tea or alcohol, and only towards the end of the cure should they be permitted to drink red Bordeaux, which is rich in tannin. A dry climate of the plains is advised, for altitude or sea air may very often cause congestion of the lungs. It is not necessary to insist upon a rest cure and indeed, in some cases, occupation is especially indicated. In a case of hemoptysis, if it is slight, a short rest in bed will suffice, together with cathartic and hypotensive treatment. If the hemoptysis is more abundant, it may be treated a little more seriously, by intramuscular injections of emetine.—*L'hypertension du tuberculeux; son traitement, Colbert, J. d. Méd. & d. Chirurg. Prat., September 25, 1919, xc, 689.*

**Hemoptysis.**—In 85 per cent of 157 hemoptysis patients the course of the tuberculosis was comparatively mild. In 50 per cent there had been an acute exacerbation before the hemoptysis, and in 37 cases with recurring hemoptysis the mild character of the disease had not been modified. In 46 cases there was no fever at any time while under observation. Hence, the hemoptysis in itself cannot be incriminated for the acute exacerbations in the graver cases. Under strict bed rest and morphine, the tendency to hemorrhage rapidly subsided. Visiting and and loud speaking are forbidden; only cool, fluid food is allowed, and the bed linen and clothing are not changed during the first few days, merely covered with clean if spotted. An ice bag to the chest helps to immobilize the patient. In the rebellious cases, a mixture of 0.1 gram each of lead acetate and pulverized digitalis leaves is administered five times a day, never for more than a week and usually only for four or five days at most. Only in 8 of 157 cases was this called for either by the tenacity of the hemorrhage or its increasing intensity.—*Haemoptysens Forhold til Lunge-tuberkulosens Exacerbation samt Bemaerkninger om dens Behandling, I. Rosenthal, Ugeskr. f. Laeger, July 29, 1920, lxxxii, 973.*

**Effect of Pulmonary Tuberculosis on Vital Capacity.**—Vital capacity varies considerably in different occupations and modes of living. It is affected by fatigue. Dreyer studied the effect of pulmonary tuberculosis on the vital capacity of 150 tuberculous patients at the Brompton Hospital, London. He was able without seeing the cases, but simply from the measurements, to classify these persons as normal or as mild, moderate and severe tuberculosis in practically absolute agreement with the clinical diagnosis. The authors, endeavoring to prove or disprove Dreyer's observations, studied the vital capacity of 174 patients, of whom 117 were cases of disease of the respiratory tract, including 90 definitely tuberculous. From the observations it appears that pulmonary tuberculosis has a definite influence on the vital capacity. The latter decreases in relation to the body weight as the disease progresses, being in direct proportion to the amount of disease present. It increases as the lung heals and the patient's condition improves. With active disease, it indicates slight variations in the patient's condition before there is a noticeable change in his symptoms and signs. It appears that the careful study of the vital capacity in its proper relationship to other body measurements will give important information in the diagnosis of pulmonary diseases, especially tuberculosis. It will aid in the accurate classification of the cases, and in determining the progress of the disease and the influence of treatment. It is a simple and harmless method of determining the patient's actual physical fitness or limitations.—*A Study of the Effect of Pulmonary Tuberculosis on Vital Capacity: First Report, F. W. Wittich, J. A. Myers and F. L. Jennings, J. Am. M. Ass., November, 1920, lxxv, 1249.*

**Which Lung is Most Frequently Involved in Tuberculosis?**—After summarizing the observations of Strandgaard at Boserup and Cavalcanti at Davos, Mayer proceeds to analyze the first 2500 cases from Turban's Sanatorium. His results, in the

main, corresponded with those of the other observers. The right sided lesions slightly outnumbered the left. He tabulates the cases as follows:

*Preponderating right-sided lesion*

| STAGE | NUMBER | PER CENT |
|---|---|---|
| I | 288 | 47.60 |
| II | 480 | 54.86 |
| III | 496 | 48.63 |
| Total..... | 1264 | 50.58 |
| *Both sides equally involved* | | |
| I | 16 | 2.64 |
| II | 10 | 1.14 |
| III | 8 | 0.78 |
| Total..... | 34 | 1.36 |
| *Preponderating left-sided disease* | | |
| I | 301 | 49.76 |
| II | 385 | 44.00 |
| III | 516 | 50.59 |
| Total..... | 1202 | 48.08 |

The predilection of the right apex for tuberculosis is the result of the asymmetrical branching of the vessels and bronchi in a three lobed lung. Because of poor aeration, the retention of pathogenic organisms, once they have gained access to the lung, is favored and because of poor circulation, disease, once started, becomes progressive.—*Welche Lunge erkrankt am häufigsten an Tuberkulose? A. E. Mayer, Münch. med. Wchnschr., August 6, 1920, lxvii, 935.*

**Comparison of Staining Procedures for Tubercle Bacilli.**—The authors commend their modification of the Spengler method for the demonstration of tubercle bacilli. After the smear has been stained, in the usual manner, with carbolfuchsin solution, it is decolorized for twenty seconds with a 15 per cent nitric acid solution. It is then briefly rinsed and again treated for ten seconds with nitric acid; rinsed again and afterward counterstained for about thirty seconds in Spengler's picric-acid-alcohol mixture (saturated aqueous picric acid and absolute alcohol, equal parts). The smear is again rinsed and allowed to dry and is now ready for microscopic study. Out of 170 sputum specimens the Ziehl-Neelsen method yielded 59 positives and the Spengler original method gave 61, whereas the modification just described furnished 62 positives. Furthermore, the average number of bacilli visible in the field was 31 for the modification, 26 for the Spengler original method and only thirteen by the Ziehl-Neelsen method.—*Neue Färbungsverfahren für Tuberkelbazillen, K. W. Zötten & P. Haarmann, Münch. med. Wchnschr., June 11, 1920, lxvii, 692.*

**Toxicity of Tubercle Bacilli Products.**—The autolysate or water-lysate of virulent or avirulent, human or bovine, tubercle bacilli in proportion of four parts by volume of bacilli to ten of fluid possesses no toxicity for mice when injected intraperitoneally in a single dose of one cc., nor for guinea pigs in a single intraperitoneal injection as large as 10 cc.—*The Primary Toxicity of Certain Preparations from Tubercle Bacilli for Mice and Guinea Pigs, H. J. Corper and M. Moore, J. Infect. Dis., November, 1920, xxvii, 499.*

**Chemical Composition of the Tubercle Bacillus.**—Goris has studied three phases of the chemistry of the tubercle bacillus and gives an extensive review of the work already done on each. I. Organic constituents chiefly lipoids, are considered. Previous investigators have shown that by the use of suitable lipoid solvents, as chloroform, alcohol, ether, benzene, and xylol, about 40 per cent of the dry weight of the organism may be extracted. The extract contains a wax which consists partly of an ester of an alcohol of high molecular weight, the fatty acids, oleic, lauric, palmitic, stearic, and arachidic, a phosphatid, probably lecithin, and possibly a substance of the group of cholesterols. Goris used large quantities of a mixture of human and bovine bacilli grown on glycerol broth, killed at 110°, filtered, washed, thoroughly dried and triturated. Approximately 40 per cent of the dried material dissolved in chloroform. The crude lipoid melted at 42°. Its index of saponification was 124.4, of acidity 37.0, and of esterification 87.4. The Hehner number (sum of insoluble fatty acids and nonsaponifiable lipoids) was 69.77 and the I number 16.22. Four partitions were made of the chloroform solution. First, a substance which proved to be insoluble in ether separated out on concentration of the chloroform. This substance, not previously described, Goris calls hyalinol, referring to its physical appearance. The mother liquor was

evaporated to dryness and the residue taken up in boiling acetone. A residue was left, and on chilling the acetone more was deposited. Finally the cold acetone solution was evaporated to dryness. The hyalinol made up 1 per cent of the dry weight of the bacilli and 2.5 per cent of the lipoid. It melted at 175°, softening between 160–165°. It was hard and elastic, and quite insoluble in water, alcohol, acetone, and ether. On purification by repeated solution in chloroform and precipitation with ether it analyzed as follows: C 55.5 per cent, H 7.15 per cent, O by difference 37.35 per cent. On saponification it yielded an unknown substance and a mixture of crotonic and isocrotonic acids. The waxy material, insoluble in acetone, contained N and P and stearic and palmitic acids apparently in substances of the phosphatid group, and lauric acid in combination with an alcohol of high molecular weight, melting at 64°, corresponding to descriptions of "mykol." A sulphur containing substance and an alcohol melting at 100° were also present. In the acetone soluble fraction glycerides of butyric, caproic, oleic, palmitic, stearic, and arachidic acids were identified. Cholesterol could not be identified surely in the lipoids of the tubercle bacillus, although a substance was encountered which in chloroform solution gave a weak coloration like that of cholesterol with sulphuric acid on prolonged standing. After the chloroform extraction the lipoid free, redried bacilli were taken up in water and the water-soluble, alcohol-insoluble substances precipitated with 2–5 volumes of alcohol. The precipitate was a nucleoprotein containing N and P and a hexose. It was toxic for tuberculous guinea pigs. The water- and alcohol-soluble fraction contained protein split products, among which tyrosine and leucine were easily identified. Neither monoses nor polyoses were present. A search for enzymes in the tubercle bacillus was made and no sugar-splitting one encountered. II. The mineral composition of the tubercle bacillus was next determined. The ash made up 2.5 per cent of the dry weight, of which 43.4 per cent was $P_2O_5$, 22.8 per cent $H_2SO_4$, 11.6 per cent Na, 9.7 per cent Ca, 7.7 per cent K, and 5.7 per cent Mg. Traces of Fe and Mn were found. The crude lipoid gave 1.17 per cent ash, largely phosphate, the figure for the latter indicating that about 5 per cent of the lipoid was lecithin. III. Finally the problem of acid-resistance was studied. Much confusion exists on this subject, acid-fastness having been attributed by various authors to a difficultly permeable membrane, or to substances within the body with a strong affinity for the fuchsin stain, protein in nature according to some, chitinous according to others, and lipoidal according to others, the best evidence probably being for the latter. Goris and Liot found that completely defatted bacilli were not acid-fast. Of the lipoid substances hyalinol was found to be non-acid-fast, while the solid fatty acids were moderately acid-fast, and the mykol strongly so. Tests of acid-fastness were made by impregnating paper strips with a chloroform solution of the lipoid in question, drying, soaking in hot carbol fuchsin solution 5 minutes, and then destaining in 25 per cent $H_2SO_4$, aclohol at 60°, and finally water.—*Composition chimique du bacille tuberculeux, I. A. Goris, II and III. A. Goris and A. Liot, Ann. d. l'Instit. Pasteur, 1920, xxxiv, 497.*

**Chronic Intraocular Tuberculosis.**—Ocular tuberculosis is most frequently transmitted by means of the blood stream, especially the veins. An important etiologic factor is trauma. All tissues of the eye except the lens are susceptible to infection. Involvement of more than one tissue of the eye, such as iritis with choroiditis, scleritis with keratitis, or other combinations should arouse suspicion of tuberculosis. The author describes the characteristic appearance of the lesions in the various layers of the eye. The most reliable diagnostic method in afebrile cases is the subcutaneous injection of tuberculin. Patients with recent activity in the lungs are started on a combined diagnostic and therapeutic dose of 1: 50,000, which is doubled until reaction occurs. Patients who had activity several years before, and have apparently been well for a number of years, are started with 1: 10,000. Patients with no history of activity receive an initial dose of 0.5 to 1 mgm., followed every 48 hours by 2, 3, to 5 mgm., up to the point of saturation. Tuberculin treatment often is not continued long enough. A favorable result is proof that the lesion was tuberculous. Change to other forms of tuberculin should be made when treatment with one form was unsuccessful.—*Diagnosis of Chronic Intra-Ocular Tuberculosis, H. H. Stark, J. Am. M. Ass., October 2, 1920, lxxv, 923.*

**Ocular Tuberculosis.**—The manifestations of tuberculosis which the ophthalmologist is called upon to diagnose or treat are located most frequently in the choroid. Tuberculosis of the choroid occurs in three fairly distinct forms: Choroiditis exudativa, miliary tubercle and conglobate tubercle. The first is the most common. The exudate may be disseminated or discrete; it first appears in yellowish patches with a hazy edge which later on become pure white and

sharply defined. The disease may become arrested. If it progresses opacities develop in the vitreous, the lens becomes opaque, the retina detaches and atrophy of the globe follows. The symptoms vary from slight impairment of vision to blindness. There are subjective sensations of light in the early stages. Miliary tubercles of the choroid are much rarer. They are 0.5 to 1 mm. in diameter, often multiple. They represent the typical miliary tubercle and occur in patients with miliary, bone and joint tuberculosis and tuberculous meningitis. They are of great diagnostic importance. The conglobate tubercle of the choroid is a tuberculous nodule often appearing as a small tumor projecting into the vitreous. It may be hard to differentiate from sarcoma. If the diagnosis is in doubt, the eye should be removed. Retinal tubercle is usually connected with a vein or artery, most frequently the former. It is the most common cause of recurrent retinal hemorrhage. Tuberculosis of the cornea usually resembles syphilitic interstitial keratitis so closely that a clinical differentiation is impossible. The diagnosis of tuberculosis of the eye may at times be made clinically, especially in cases of anterior uveitis. Choroidal and retinal tubercles may be recognized with the ophthalmoscope. In the majority of cases, however, the diagnosis is arrived at by injection of tuberculin. After a complete physical examination a diagnostic injection of O.T. is given in doses of 0.1 mgm. for children to 1 mgm. for adults. This dose is doubled and repeated in twenty-four hours; if no reaction occurs, a third dose of 5 mgm. is given 48 hours later. A focal reaction in the eye is diagnostic, a general reaction with fever only suggestive. The prognosis of ocular tuberculosis is grave. Treatment consists in general hygienic and dietetic measures, removal of all foci of infection, even though they appear to have no relation to the tuberculous process. Locally, atropin is useful by putting the ciliary muscle at rest. The specific treatment consists in injections of T.R. At first one fifty thousandth of a mgm. is given every five days and the dose gradually increased so that at the tenth injection the patient receives one five thousandth of a mgm. If a focal or general reaction should occur, the dose must be reduced. A dose of one hundredth of a mgm. once a week is not exceeded. These injections may have to be kept up for months. A report of 4 cases of ocular tuberculosis observed at the Bellevue Hospital (N. Y. City) follows.—*Ocular Tuberculosis, F. B. Bogardus, Am. J. Ophthal., September, 1920, 111, 661.*

**Ileocecal Tuberculosis.**—The two cases described illustrate the close similarity of the early ileocoecal tuberculosis with that of the ordinary forms of acute nonsuppurative and suppurative appendicitis. This is explained by the fact that the appendix is either primarily involved or secondarily from the colon or small intestine. The differential diagnosis has to consider acute and chronic inflammatory and neoplastic disease of the appendix itself and of the neighboring parts of the small and large intestine, affections of the omentum, mesentery, lymph nodes, the adjacent part of the genitourinary tract and the cellular tissue of the retroperitoneal space. Local evidence, such as furnished by the cystoscope or X-ray, is conclusive. Few errors should occur in the more chronic forms of the disease. In the acute cases accuracy often is not possible until the lesion is exposed during the operation. Fortunately, in the majority of such patients, the indications are the same. A roentgenographic picture showing hypermotility and spasm or filling defects in a patient with pulmonary tuberculosis should lead to a definite diagnosis of colonic tuberculosis. The procedure of choice is a clean resection of the ileocecal junction extending well into the healthy portions on either side. It is safest to close completely the stumps of the bowel and to reëstablish the continuity of the intestine by side to side anastomosis. Fecal fistula is a common complication of the postoperative period of ileocecal tuberculosis, and the sinus persists for long periods of time, because of the communication with the interior of the bowel.—*Ileocecal Tuberculosis, A. O. Wilensky, N. York M. J., November 13, 1920, cxii, 768.*

**Occluded Renal Tuberculosis.**—Renal occlusion may occur so insidiously that but few subjective symptoms accompany the process. Among the most common etiologic factors are renal tuberculosis, ureterolithiasis and nephrolithiasis, carcinoma of the bladder, pyelonephritis and renal atrophy, stricture of ureter following infection other than tuberculosis, operative trauma, pressure and involvement by abdominal neoplasms. There were 621 patients operated upon for renal tuberculosis from January, 1900, to January, 1919, at the Mayo clinic. In 69 of these the affected kidney was found to be occluded. The clinical symptoms often reflect the time of occlusion. The patient usually has previously had a period of marked polyuria and dysuria which suddenly diminished or ceased; the constitutional symptoms improved, with gain in weight. Renal occlusion occurs virtually twice as often in the

male as in the female. It is most frequent in adults in the fourth and fifth decade. It occurs in about ten per cent of the cases of chronic renal tuberculosis and can be recognized by means of clinical, roentgenographic and cystoscopic data in fully ninety per cent. The usual symptoms are persistent frequency, dull pain or abdominal tumor, usually lasting many years. At first the occluded kidney may be a focus of infection, but after many years it usually becomes sterile. In the presence of persistent frequency, dull pain or abdominal tumor, nephrectomy is indicated. The postoperative results are usually excellent, with recovery from the various symptoms. In cases of bilateral tuberculosis, the removal of an occluded kidney will not benefit the patient and operation should not be performed.—*Occluded Renal Tuberculosis, W. F. Braasch, J. Am. M. Ass., November 13, 1920, lxxv, 1307.*

**A Complicated Case of Renal Tuberculosis.**—A male, 46 years old, had an external urethrotomy performed for acute retention October, 1915. He was readmitted March, 1918, for right inguinal abscess which was opened; two weeks later the wound had practically closed and the patient was discharged. He was readmitted May, 1919, for left inguinal abscess. A small sinus in the perineum and a large amount of pus in the urine were found. Culture of the abscess showed B. coli. The patient was readmitted December 12, 1919, with numbness of the feet and inability to walk. The inguinal sinus had drained more or less constantly since May and was still draining thin pus. The scrotum was red and tender, the perineum red and brawny with one or two small fistulae. There was incontinence of urine and feces, general weakness and involuntary twitching of the leg muscles, diminished sensation up to the level of the 10th or 11th dorsal vertebra, saddle area of anesthesia about the tip of the coccyx. X-ray examination revealed a large shadow, shaped like the renal pelvis, on the left side. External urethrotomy, excision of sinuses and scar tissue and drainage of a large perineal abscess were performed. Nephrectomy revealed a kidney containing a large stone. The microscopic appearance was that of tuberculosis. On February 3, the patient was discharged with the perineal wound practically closed, the inguinal sinus completely closed, and the motility of the legs and sensation returning. He subsequently gained 15 to 20 pounds, feels strong now, is able to walk without difficulty, the sensations and sphincters are normal. Although this patient was under more or less constant observation since 1915, there was nothing at any time to arouse the suspicion of renal tuberculosis, stone, or any other kidney lesion. The author has never seen transverse myelitis as a complication of renal sepsis of any sort. Search of the recent literature has thrown no light on the subject. The development of transverse myelitis may be explained by a direct extension of the septic process to the epidural space or to toxic origin. The latter is more likely. Calculus in a tuberculous kidney is uncommon. No cases were found in the literature. It was the first case of inguinal renal fistula ever seen at the Massachusetts General Hospital. Search of the literature reveals an almost equal paucity of material for the last 20 years. Formerly renal fistula either as a preoperative complication or as a postoperative result was by no means rare. It is encouraging to realize that owing to the greater tendency of patients to seek earlier relief for their ills, to more accurate and earlier diagnosis, and to better surgery, what was once a not uncommon condition has become practically extinct.—*Renal Tuberculosis Complicated by Inguinal Renal Fistula, Transverse Myelitis, and Renal Calculus, J. D. Barney and W. J. Mixter, J. Urol., August, 1920, iv, 391.*

**The Kidney in Pulmonary Tuberculosis.**—The kidney is normal in the majority of cases of pulmonary tuberculosis, but the principal lesions that this organ may present are amyloid degeneration, chronic nephritis and acute morbid processes. During the evolution of pulmonary phthisis amyloid degeneration will first develop in the liver, spleen, and suprarenal capsules before attacking the kidney, and it is not uncommon to find a massive amylosis of these viscera while only a few glomeruli and some arteriolae of the pyramids will offer an amyloid infiltration. At this phase of the process, excepting in cases where some chronic lesion preëxists, there usually is no clinical symptom of nephritis and only an albuminuria or a polyuria will occasionally direct the physician's attention to the kidney. In these cases, a study of the urinary secretion will reveal a most peculiar syndrome; on the one hand there is a considerable drop in Ambard's coefficient, and on the other, in spite of a sufficient chloruria, the percentage of the chlorides of the serum is below the level of normal secretion. It is consequently to be supposed that these signs indicate an exaggeration of the renal power of concentration—a kind of hypersecretion. When a histological examination can be made in good conditions, a peculiar hypertrophy of the cells of the tubuli will be found, which seems to be the histologic evidence of

hypersecretion. From the practical standpoint, this urologic syndrome in a tuberculous subject should lead to the diagnosis of amyloid degeneration of the kidneys before the advent of extensive edema, massive albuminuria and incorrigible diarrhea, An ordinary Bright's disease may be met with in pulmonary tuberculosis and usually the inoculation of the urine or a bit of the renal tissue will remain negative, but a positive result is not in itself sufficient to regard a vulgar nephritis as due to the bacillus of tuberculosis. A syndrome of nephritis may depend upon certain tuberculous infiltrations of the kidney—real follicular nephritides. Finally, Koch's bacillus may provoke certain atypical lesions of the kidney, such as a secondary sclerous reaction invading the tubercle, or an interstitial infiltration which, from the onset, is unlike the classic follicle. In the kidney the connective tissue reaction is much more common. The sclerosis forms local cicatrices which for a long time are infiltrated with round cells and in which the presence of the tubercle bacillus can be demonstrated. The remainder of the cortex, even the areas adjacent to the tuberculous lesion, remain intact for a long time. In those cases where the most extensive lesions have produced the syndrome of both chloride and nitrogenous retention, this special character of tuberculous sclerosis, will also be found, and given these data, it is unlikely that the tubercle bacillus can be incriminated in ordinary Bright's disease of tuberculous patients. Koch's bacillus can provoke acute generalized lesions of the kidney under peculiar circumstances, but two elements are necessary for their production. On the one hand, a subject in the state of allergy, sensibilized for certain doses of antigen by the infection of the first inoculation which he has received—such is the case of the phthisical subject; on the other, a massive reinoculation of Koch's bacilli by way of the blood and also, perhaps, by its soluble toxins, an acute reaction to tuberculin being manifest. Such a bacillemia suddenly occurring may cause death with hardly any clinical reaction and it alone can explain the generalized acute lesions of the kidney, lesions paradoxical in appearance found at autopsy of certain cases of chronic pulmonary tuberculosis. Some instances of terminal acute nephritides represent the same pathogenesis. A less intense allergic reaction likewise undoubtedly explains certain acute hemorrhagic nephritides of a temporary kind that clinically represent a true Koch's phenomenon in the kidney.—*Editorial, Med. Rec., November 20, 1920, xcviii, 862.*

**Associated Lung and Joint Tuberculosis.**—In cases of simultaneous affection of lungs and joints, the prognosis depends on which process began first, as the second process acts like a derivation or a fixation abscess, diverting the disease to this second point. When this second process occurs in the lungs, these vital organs soon become compromised, but when the process of derivation is in a limb, it does comparatively little harm, and this second process should be encouraged rather than suppressed. Hence the prognosis is comparatively favorable when the bone or joint process had developed secondarily to the pulmonary process. A few instances of each type are cited, and also some cases which show the disastrous results when a secondary bone or joint process was operated on and cured, thus depriving the primary lung process of this outlet. On the other hand, benefit resulted when a primary bone or joint process was operated on and cured, the necessity for the lung's sacrificing itself thus being done away with.—*Considérations cliniques sur les tuberculoses mixtes (pulmonaires et ostéo-articulaires), A. Jacquemin, Bull. Méd., September, 1920, xxxiv, 835.*

**Stigmata of Predisposition to Bone and Joint Tuberculosis.**—Rivers found that in cases of bone and joint tuberculosis red and reddish hair is nearly twice as frequent as in the ordinary population. As to the situation of the tuberculous lesion, the spine was rarely attacked in the red haired. Hardly more of them than of the others had multiple tuberculous lesions. Permanent freckling was a little commoner in bone and joint tuberculosis than is normal. The percentage of ichthyosis was 1.6. It is at least twice as frequent in bone and joint tuberculosis as in nontuberculous children.—*Stigmata of Predisposition to Bone and Joint Tuberculosis, W. C. Rivers, Brit. J. Child. Dis., July-September, 1920, xvii, 140.*

**Exophthalmic Goitre and Tuberculosis.**—Sergent is inclined to accept a causal relation when symptoms of exophthalmic goitre develop in the course of tuberculosis. The great danger is that persons with merely exophthalmic goitre may be classed as tuberculous and sent to a sanatorium, where they acquire tuberculosis and the mistake is never discovered. Many of the symptoms are common to both, the unstable temperature and pulse, variable blood pressure, menstrual irregularities, the bright eye, burning cheeks, sweats, emaciation, early fatigue, asthenia, diarrhea, and pain in the celiac plexus and in the intestines, but the

most misleading symptoms of hyperthyroidism are the short dry, spasmodic cough and the tendency to shortness of breath on exertion. The rhythm of breathing is staccato, spasmodic. Differentiation is possible only by recognizing the clinical picture of thyroid overactivity on the one hand and absolutely excluding active tuberculous lesions on the other hand. Especially at the two extremes of the sexual life of women, at puberty and the menopause, we should be on the alert to detect hyperthyroidism. The instructive examples reported are all in women, but there are also men whose overactive thyroid led to erroneous treatment for tuberculosis.—*Syndrome du Basedow et tuberculose, E. Sergent, Paris Méd., July 24, 1920, x, 80.*

**Tuberculosis and Influenza.**—From a review of the literature, from replies to a questionnaire and from studies of the history of the epidemic as it affected the patients in Massachusetts sanatoria (2000 cases) and from an investigation of their present condition the following conclusions were drawn: Eternal vigilance is the price of safety. We must regard any patient who comes down with a cold or other acute symptoms, whether or not he has tuberculosis, as a possible case of influenza and a source of contagion. Although it is quite possible or rather probable that the tuberculous patient does possess a certain degree of immunity against influenza, this must not be taken for granted and every effort must be made to prevent his getting it. The treatment of the tuberculous patient with influenza is the same as that of the person without tuberculosis and should be based on rational lines of rest, elimination and stimulation when necessary. It should be regarded at all times as a serious but by no means a hopeless or fatal complication. Postinfluenzal bronchitis and debility are real and definite clinical entities but in many cases they serve merely to disguise a newly awakened pulmonary tuberculosis. In every case of influenza when there is either a cough or prolonged physical depression following the disease, the patient should be kept under careful and constant supervision. The early diagnosis of pulmonary tuberculosis, always a difficult task, has been made increasingly so on account of influenza and its effects. While undoubtedly many cases of tuberculosis have been discovered or made active on account of influenza, there are numerous patients who have been wrongly classified as consumptives owing to signs and symptoms, constitutional and referred to the lungs that were really due to influenza and not to tuberculosis. Care, conservatism and common sense are needed now more than ever in handling this difficult problem.—*Tuberculosis and Influenza, J. B. Hawes, 2nd, Boston, M. & S. J., November 18, 1920, clxxxiii, 596.*

**Open Pulmonary Tuberculosis in Infants.**—All cases in infants which show clinical signs of pulmonary tuberculosis should be considered as open whether bacilli can be detected in the sputum or not. The sputum is hard to obtain, and repeated examinations of it are often negative. There is a lack of guinea pigs for diagnostic purposes in Germany. The stools, moreover, have failed to show tubercle bacilli. A case is cited which undoubtedly infected three adult attendants and five other children. These cases are especially dangerous because of the high position and shortness of the infantile larynx which retains little of the sputum and favors droplet infection with any violent expiration.—*Zur Frage der offenen Lungentuberkulose im Säuglingsalter, Klotz, Münch. med. Wchnschr., August 13, 1920, lxvii, 964.*

**Hemolytic Test for Tuberculosis.**—Letulle relates that the National Antituberculosis Society has recently officially advocated the Calmette-Massol technic for the complement deviation test as an aid in the early diagnosis of tuberculosis. He describes it in detail and commends it further for the diagnosis of syphilis as well. The principle of the test is the adding of progressively increasing amounts of complement to a constant amount of serum and of antigen.—*La technique de Calmette et Massol pour la reaction de Bordet-Wassermann, M. Letulle, Presse méd., August 25, 1920, xxviii, 588.*

**Complement Fixation.**—This investigation was undertaken with a view to ascertain if it were possible to obtain sufficiently reliable results to warrant regarding the reaction as specific for the diagnosis of active tuberculosis. The conclusions drawn from the results are: (1) A negative reaction is as reliable an indication of the absence of an active tuberculous lesion as a positive reaction is of its presence. (2) The complement fixation test is a specific means of diagnosis of the presence of an active or recently active lesion. (3) A positive reaction in the highest dilution of complement is just as reliable an indication of the presence of such a lesion as a positive reaction in all three dilutions.—*The Complement Fixation Test in Pulmonary Tuberculosis: Its Use as a Means of Diagnosis, A. L. Punch, Lancet, September 25, 1920, cxcix, 647.*

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